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ABSTRACT

This is the final report of a workshop in which selected teachers from Florida public schools learned about energy technology and conservation, and teaching methodology needed to incorporate energy education into existing school curriculum. Participants were teachers of science, social studies, environmental studies, and home economics. During the first week, energy issues such as nuclear power, alternative energy sources, biological energy systems, and electrical power generation were studied. Social and environmental cost benefits of various alternatives were explored, also. The second week was devoted to developing teaching materials and skills. Curriculum models and model lessons, some of which make use of newspaper articles, are provided. These involve (1) distinction between ethical and non-ethical questions, (2) development of argumentation skills, (3) problem definition, and (4) social change theories. Eight sample classroom activities, prepared from existing governmental reports, are included. These rely on maps and charts to help students understand energy supply, conversion, and use. (AV)

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FINAL REPORT

Volume I

United States Energy Research and Development Administration
400 First Street, N.W.
Washington, D.C. 20545

ED127243

IMPLEMENTING ENERGY EDUCATION IN FLORIDA'S HIGH SCHOOLS:

A Two-Week Credit Institute for Teachers in North Florida

Project Director: Rodney F. Allen, Associate Professor
Science and Human Affairs Program
Florida State University
Tallahassee, Florida 32306
(904) 644-5769

Contract Dates: March 1, 1976 - September 1, 1976

Contract Amount:

Institute Dates: June 21 - July 2, 1976

SE 009 349

Final Report prepared by:

David E. LaHart
Rodney F. Allen

THE FLORIDA STATE UNIVERSITY

1. INTRODUCTION

Education in Florida's public schools is developing a national reputation for highly innovative and enlightened programs that uniquely respond to public interest. Schools in Florida reflect the values, norms and concerns of current society. The responsiveness of the Florida system is largely due to the highly skilled classroom teachers employed by the system and the flexibility of the curriculum.

Recent public awareness of environmental and other energy related problems led to the establishment of the Florida Office of Environmental Education within the Department of Education. This office is strategically located directly on the Commissioner of Education's staff and enjoys a unique prominence in state educational structures. The field staff of this office are in regular contact with teachers and principals throughout the 67 school districts in Florida. Each district and each school within that district has a person responsible for implementing environmental education. This structure of field coordinator, district contact and school resource person provides the mechanism for implementing energy education programs in Florida.

The Environmental Education Project at Florida State University has worked closely with the Florida Office of Environmental Education to provide a series of inservice teacher training workshops throughout Florida. These workshops deal primarily with specific content areas such as beach ecology or specific implementation strategies such as developing valuing skills. Last year over 100 such workshops were conducted in Florida.

A. The Need

A frequent need expressed by teachers was for specific content instruction in the realm of energy education and ways to teach energy education in its broadest scope. Teachers expressed the desire for workshops that would open a new content area for them but within the subject matter they currently teach. Science teachers wanted to learn more about the technology of biological and physical energy systems; home economics teachers expressed interest in exploring the many dimensions of energy use and conservation in areas that relate to family life and personal values.

This workshop developed from a felt need by Florida teachers to better understand energy, energy conservation, and lifestyles.

B. Scope and Objectives

This workshop was comprehensive. It dealt with both factual matter such as energy technology and conservation, and with the teaching methodology needed to put energy education into existing school curriculum in several appropriate disciplines.

Objective One: To conduct workshops for secondary school teachers of science, social studies, environmental studies or home economics. Approximately 40 teachers will attend the workshop.

Objective Two: To introduce workshop participants to a variety of broadly based energy related issues including nuclear power, alternative energy sources, biological energy systems, and electrical power generation. The workshop will provide as much factual information as possible and explore alternatives in terms of social and environmental cost/benefits.

Objective Three: Workshop participants will be trained in energy education techniques appropriate for their disciplines. All too often, workshops and short courses educate teachers, but fail to give them the necessary skills or instructional tools to educate their students. One full week of this workshop will be devoted to teaching techniques.

C. Selection of Workshop Participants

The regional consultants of the State Office of Environmental Education, in conjunction with the State Director and environmental education contact persons in local school districts, were responsible for identifying participants for the workshop. They selected from secondary school teachers of science, social studies, environmental education, and home economics, employing the following criteria:

a) support of teachers' school principals and school district administrative staff;

b) distribution so as to involve as many schools as possible in an area;

c) distribution to achieve involvement on a sex, racial, ethnic balance;

d) priority to teachers in low-income and low-student-achievement educational environments; and

e) distribution to achieve a balance in curriculum areas (science, social studies, environmental education, and home economics.)

D. The Workshop Format

Reductions in funding prevented us from implementing the type of workshop that has proven most effective for dealing with inservice teachers. The alternative model employed for this project provided a week of "energy content" that enabled participants to up-date their knowledge about energy and its meaning to current American life-styles. The first week dealt extensively with energy resources and the agencies that are responsible for their development and distribution. In addition, participants were given an overview of the relationship between the four E's; energy, environment, economics and ethics during the first week. This overview served as a useful frame of reference throughout the entire workshop.

The second week of the workshop was devoted to developing the materials and skills needed to transmit the newly developed knowledge of the teacher-participants. Participants were divided into functional groups and then sub-divided into working groups. Various curriculum models and model lessons were demonstrated and the sub-groups were allowed time and opportunity to develop a format and model lesson. During the last part of the second week, the sub-groups were allowed to work independently. Specific meetings functioned merely as feedback sessions, enabling the sub-groups to obtain comments and exchange information with all workshop participants. Volume II of this report contains the participant-developed energy education units.

E. Schedule of Project Activities - 1976

March April May June July August September

....Notice of Funding.....
.....Revise budget to reflect budget cuts.....
.....Identify sources of materials, films....
...Begin recruiting teachers in selected areas
....Order workshop materials, identify consultants
...Draft program, hire consultants
...Notify successful applicants
...Finalize program, distribute program
...Content portion of workshop
...Implementation portion of workshop
.....Final Report (Volume I)
....Final Report (Volume II)
....Final Fiscal Report....

F. Cooperating Agencies

It is impossible to identify all the local, state and federal agencies that helped make this Institute a success. School districts distributed application forms and information about the workshop, various agencies supplied materials and films, others furnished speakers and panelists.

Certainly the cooperation of the staff at the Tallahassee Junior Museum was a major factor in making the workshop participants welcome and comfortable. Dr. Carlos Warren, Director of the Florida Energy Office, generously offered his own time and a great deal of staff time to help facilitate the workshop and make it function smoothly.

The Florida Office of Environmental Education, Department of Education, provided the key mechanism to recruit participants and ensure the quality of those selected. C. Richard Tillis, Office Director, and Paul Coley and Jim Phillips, Regional Coordinators, made valuable contributions long before the first workshop session.

G. Workshop Publicity

(See APPENDIX A).

2. LIST OF PARTICIPANTS

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REPORT ON "PROTECTED GROUPS"

	Male	Female	N
TOTAL PARTICIPANTS	16	22	38
Blacks	1	7	8
Spanish-speaking	2	0	2
Indians (Native American)	1	0	1
Oriental	1	0	1

3. REPORTS ON DAILY ACTIVITIES

NORTH FLORIDA ENERGY EDUCATION INSTITUTE

PROGRAM

Monday, June 21, 8:30AM Coffee

Values and Energy Education

Dr. Rodney F. Allen, Science and Human Affairs Department, Florida State University

Welcome:

C. Richard Tillis, Director, Florida Office of Environmental Education
Paul Coley, Regional Coordinator, Florida Office of Environmental Education

Workshop Overview and Objectives

David E. LaHart, Environmental Education Project, Florida State University

*** Brown Bag Lunch and Films ***

Concurrent Sessions:

The Energy Computer

Dr. Bruce Nimmo, Florida Technological University

"Ways" to Energy Education

Dr. Rodney F. Allen and David E. LaHart

Adjourn -- 3:00PM

Tuesday, June 22, 8:30AM Coffee

The Florida Energy Office Functions, Goals and Concerns

Dr. Carlos Warren, Director, and Rosalyn Tillis, Education Specialist

Energy Flow and the Net Energy Concept

Arthur R. Marshall, Ecologist and former Director, Urban Ecology Center, University of Miami

*** Brown Bag Lunch and Films ***

Registration and Fees Collected

Net Energy and Lifestyles - Discussion and Interaction

Arthur R. Marshall and Dr. Rodney F. Allen

Adjourn -- 3:00PM

Wednesday, June 23, 8:30AM Coffee

Nuclear Energy in Florida

Dr. R.H. Davis, Physics Department, Florida State University
Bob Touchton, Westinghouse Electric
J.H. "Jack" Francis, Florida Power and Light
Leon Weaver, Talquin Electric

Discussion and Interaction Session

*** Brown Bag Lunch and Films ***

Petroleum Energy in Florida

Ted Duncan, Florida Petroleum Institute

Discussion and Interaction

Adjourn -- 3:00PM

Thursday, June 24, 8:30AM Coffee

Solar Energy in Florida

Del Ward, Florida Solar Energy Center
Bob Pozzo, Florida Energy Office
Yvonne Moffat, Florida Solar Power, Inc.
Roger Nichols, Solar Energy Consumer and Department of Education

*** Brown Bag Lunch and Films ***

The National Energy Outlook

David Anthony, University of Florida

The Florida Energy Picture -- an Educator's View

Dr. Rodney F. Allen

Adjourn -- 3:00PM

Friday, June 25, 8:30AM Coffee

Consumers and Energy Consumption

Carol Erkert, Santa Fe Community College
Lee Rumbley, Division of Consumer Services
Ann Parramore, Leon County Extension Service
Kitty Funderberk, Department of Education

*** Lunch and Field Trip ***

Visit to the Purdon Power Plant, St. Marks, Florida

Host: Howard Hawthorn

END OF FIRST WEEK'S ACTIVITIES 10

SECOND WEEK: NORTH FLORIDA ENERGY EDUCATION INSTITUTE

Monday, June 28, 8:30AM Coffee

BREAK INTO FUNCTIONAL GROUPS

Designing Instructional Materials: Staff

Functional Curriculum Models: Staff

Discussion/Interaction Period

*** Brown Bag Lunch and Films ***

Hands-on Experiences with Demonstration Materials

Solar Still
Windmills
Solar Panel

Planning the "manufacture" of student learning materials

Adjourn -- 3:00PM

Tuesday, June 29, 8:30AM Coffee

Florida's Energy Education Materials

Tom Baird, Energy Management Center
Marjorie Ebersbach, Brevard Center for Environmental Learning
Bill Hammond, Lee County Environmental Center
Dallas Maddron, Orange County Environmental Education Project

*** Brown Bag Lunch and look at the materials ***

Education with the Energy Research and Development Administration's Materials: Staff

Group work on material design

Adjourn -- 3:00PM

Wednesday, June 30, 8:30AM Coffee

More Energy Education Materials from the USA: Staff

National Association of Science Teachers
The State of Washington Project
Using Federal and State Publications

*** Brown Bag Lunch and look at the materials ***

Development of Draft Activities (work with functional groups)

Adjourn -- 3:00PM

Thursday, July 1, 8:30AM Coffee

Demonstration of materials and ideas produced to date

Energy and Values Materials

Group work on activities and units

*** Brown Bag Lunch and Films ***

Group work on materials

Adjourn - 3:00PM

Friday, July 2, 8:30AM (AT LAST) Coffee

Energy and Human Values Panel

Bill Ryan, House Growth and Energy Committee
Peter Butzin, Common Cause
William McGill, Leon County-Tallahassee Community Action Program, Inc.
Joseph Jenkins, Public Service Commission

Discussion/Interaction

*** Lunch and Film ***

Demonstration of Participant Produced Energy Curriculum Units

Workshop Evaluation

Roy Herndon, Environmental Resources Analysis Center

Adjourn

FILMS USED IN THE WORKSHOP

THE ENERGY DILEMMA. 20 minutes. color. sound. 16mm. Produced by Films, Inc., 8124 North Central Park Avenue, Skokie, Illinois 60076. Distributed by the U.S. Department of Commerce, Room 20-G, Collins Building, Tallahassee, Florida 32304 (Attn: Lee Wyatt). RECOMMENDED - a superb introductory film.

ENERGY AND MATTER. 9 minutes. color. sound. 16mm. Produced by the National Film Board of Canada. Distributed by McGraw-Hill Text-Films, P.O. Box 590, Highstown, New Jersey 08520. RECOMMENDED.

LIVING WITH ENERGY. 26 minutes. color. sound. 16mm. Produced by Hanna Barbara Productions, Inc. for the Standard Oil Company of Indiana. Distributed by Extension Service, U.S. Department of Agriculture, College of Agriculture, University of Georgia, Athens, Georgia 30602. NOT RECOMMENDED.

PUTTING THE SUN TO WORK. 5 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

HERE COMES THE SUN. 15 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

TO BOTTLE THE SUN. 4 minutes, color, sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

POWER FROM THE EARTH. 12.5 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

INTRODUCING ATOMS AND NUCLEAR ENERGY. 5 minutes. color. sound. 16mm. Produced by Coronet Films. Distributed by U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. OLDER FILM. MARGINAL.

A IS FOR ATOM. 8 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

CONTROLLING ATOMIC ENERGY. 8 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

TO IMMITATE THE SUN. 29 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

KING ZOG AND THE ENERGY CRUNCH. 19 minutes. color. sound. 16mm. Distributed by the Unitary Heating and Cooling Section, Air-Conditioning and Refrigeration Institute, 1815 North Fort Meyer Drive, Arlington, Virginia 22209. RECOMMENDED.

ENERGY VS. ECOLOGY. 25 minutes. color. sound. 16mm. Produced by Allis-Chalmers. Distributed by Modern Talking Picture Service, Inc., 4705-F Bakers Ferry Road, Atlanta, Georgia 30336. RECOMMENDED.

THE THREE E's: ENERGY, ENVIRONMENT, AND ECONOMICS. 27 minutes. color. sound. 16mm. Produced by the Exxon Corporation. Distributed by J.P. Reidy, P.O. Box 420, Charlotte, North Carolina 28230. MARGINAL.

NATURE'S FORGE. 29 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

THE FIRST TWENTY-FIVE YEARS. 28 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. MARGINAL.

THE WEB OF LIFE: ENDLESS CHAIN. 28 minutes. color. sound. 16mm. Distributed by the U.S. Energy Research and Development Administration, Film Library, P.O. Box 62, Oak Ridge, Tennessee 37830. RECOMMENDED.

MATERIALS LIST

ENERGY AND THE ENVIRONMENT: CITIZENS' WORKSHOP HANDBOOK. Washington: ERDA, n.d.

ENERGY AND ENVIRONMENT: LEARNING ACTIVITIES FOR CAMP AND HOME. Tallahassee: Environmental Education Project, Florida State University, 1975.

ENERGY CONSERVATION: UNDERSTANDING AND ACTIVITIES FOR YOUNG PEOPLE. Washington: Office of Conservation Education, Federal Energy Administration, 1975.

HOW THINGS WORK. Maitland, Florida: Florida Audubon Society, 1975. Booklet to accompany slide-tape presentation.

THE ECONOMICS OF THE ENERGY PROBLEM. New York: Joint Council on Economic Education, 1975. Economic Topic Series.

THE ENERGY CRISIS: WHAT YOU CAN DO ABOUT IT. Chicago: Standard Oil of Indiana (MOBIL), 1975. Ditto Masters Kit.

ANNUAL REPORT TO THE LEGISLATURE, 1975-76. Tallahassee: The Florida Energy Office, 1976.

ENERGY ACTIVITY GUIDE. Arlington, Virginia: Energy Interpretation Project, National Recreation and Park Association (NRPA), 1975. Tabloid.

"How Safe is Nuclear Energy?", NEWSWEEK, 1976.

TEACHERS' GUIDE, THE ENVIRONMENTAL IMPACT OF ELECTRICAL POWER GENERATION: NUCLEAR AND FOSSIL. Harrisburg: Pennsylvania Department of Education, 1975. With the U.S. Energy Research and Development Administration, Washington, D.C.

THE ENVIRONMENTAL IMPACT OF ELECTRICAL POWER GENERATION: NUCLEAR AND FOSSIL. Harrisburg: Pennsylvania Department of Education, 1975. With the U.S. Energy Research and Development Administration, Washington, D.C.

THE OFFSHORE ECOLOGY INVESTIGATION. Galveston, Texas: Gulf Universities Research Consortium, n.d.

FACTS ABOUT OIL. Washington: American Petroleum Institute, n.d.

QUESTIONS AND ANSWERS ABOUT NUCLEAR ENERGY. Miami: Florida Power & Light Company, n.d.

THE SUN BELOW. Tallahassee: The Florida Petroleum Council, 1975.

ENERGY OUTLOOK, 1976-1990. Houston Texas: Exxon, 1975.

"Solar Heat Brightens Home," Tallahassee DEMOCRAT, March 21, 1976.

"Getting a Taste of Solar Energy," Washington POST, June 17, 1976.

ENERGY: A Schema Produced by the John Muir Institute for Environmental Studies, Berkeley, California.

SOLAR ENERGY, Shell Reports, January, 1976.

CREATING ENERGY CHOICES FOR THE FUTURE: HIGHLIGHTS FROM THE NATIONAL PLAN FOR ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION. Washington: ERDA, 1975. 12pp.

A NATIONAL PLAN FOR ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION: CREATING ENERGY CHOICES FOR THE FUTURE. Volume 1: The Plan. Washington: ERDA, 1976. 122pp.

A NATIONAL PLAN FOR ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION: CREATING ENERGY CHOICES FOR THE FUTURE. Washington: ERDA, 1975. 8pp.

1976 NATIONAL ENERGY OUTLOOK: EXECUTIVE SUMMARY. Washington: Federal Energy Administration, 1976. 14pp.

A FLORIDIAN'S GUIDE TO SOLAR ENERGY. Tallahassee: Florida Energy Office, 1976.

MINIATURE SOLAR WATER HEATER DEMONSTRATION UNIT. Cape Canaveral: Florida Solar Energy Center, 1976.

EXPLORING ENERGY CHOICES: A PRELIMINARY REPORT. New York: The Ford Foundation, 1974.

SOLAR ENERGY. Washington: ERDA, 1975. 11pp.

MAKING THE MOST OF YOUR ENERGY DOLLARS IN HOME HEATING AND COOLING. Washington: National Bureau of Standards, n.d.

USING SCRAP IRON AND STEEL DOES MORE THAN REDUCE SOLID WASTE. Washington: Institute of Scrap Iron and Steel, n.d.

SCRAP IS NOT JUNK. Washington: Institute of Scrap Iron and Steel, n.d.

ORGANIZING SCHOOL ENERGY CONTESTS. Washington Federal Energy Administration, 1975.

ENERGY CONSERVATION CHECKLIST FOR BUILDERS AND HOMEBUYERS. Washington: Federal Energy Administration, n.d.

E.F. Schumacher, SMALL IS BEAUTIFUL: ECONOMICS AS IF PEOPLE MATTERED. New York: Harper & Row, 1973.

USING ENERGY WISELY. Jacksonville: Mayor's Energy Office, 1975. Packet of materials.

SAVE ENERGY, SAVE MONEY. Washington: Community Services Administration, 1975.

FLORIDA ENERGY ACTIVITIES. Tallahassee: Environmental Education Project, Florida State University, mimeographed, 1976.

ENERGY CONSERVATION: PROJECT RETRO-TECH (Teacher's Kit for Course on Home Winterization). Washington: Federal Energy Administration, 1975.

R.F. Allen, et al., DECIDING HOW TO LIVE ON SPACESHIP EARTH. Evanston, Illinois: McDougal, Littell Company, 1973.

ENERGY IN SOLID WASTE: A CITIZEN GUIDE TO SAVING. Washington: Citizens' Advisory Committee on Environmental Quality, 1975.

TIPS FOR ENERGY SAVERS. Washington: Federal Energy Administration, 1975.

A PLANNER'S HANDBOOK ON ENERGY. Tallahassee: Florida Energy Office, 1975.

COAL FACTS, 1974-1975. Washington: National Coal Association, 1975.

ENERGY MANAGEMENT CENTER, PASCO COUNTY (FLORIDA) SCHOOLS. Eight Units for High Schools.

THE SUN FOCUS (Solar Industries of Florida, Inc.), Summer, 1976 Issue.

ENERGY EDUCATION PROJECT, LEE COUNTY (FLORIDA) SCHOOLS. ENERGY CARDS. Mimeographed, 1976.

THE ECONOMICS OF AMERICA'S ENERGY FUTURE. Washington: ERDA, 1975.

EXECUTIVE SUMMARY: ECONOMIC GROWTH IN THE FUTURE. New York: Edison Electric Institute, 1975.

THE FUTURE OF THE ELECTRIC UTILITIES. Washington: American Enterprise Institute, 1975.

ENERGY: THE POWER OF THE STATES. Gainesville, Florida: Center for Governmental Responsibility, Holland Law Center, University of Florida, 1975.

ENERGY AND ECOLOGY. South Norwalk, Connecticut: The Reading Laboratory, 1975. With Teacher's Guide.

ENERGY AND MAN'S ENVIRONMENT: ELEMENTARY THROUGH SECONDARY INTERDISCIPLINARY ACTIVITY GUIDE. Seattle: Education/Research Systems, Inc., 1974.

THE ENERGY PROBLEM IS HERE TO STAY. Pittsburgh: West Penn Power Company, 1975.

ENERGY/ENVIRONMENT MATERIALS GUIDE. Washington: National Science Teachers Association, 1975.

ENERGY/ENVIRONMENT SOURCE BOOK. Washington: National Science Teachers Association, 1975.

ENERGY/ENVIRONMENT MINI-UNIT GUIDE. Washington: National Science Teachers Association, 1975.

"ENERGY AND HUMAN VALUES," Peter A. Butzin, Common Cause, Florida. Mimeographed speech, with several press releases.

This list of resources omits many articles and items contributed by participants and reprinted in multiple copies. This list also omits single copies of about 100 units produced by teachers which were available for participant examination and use during the Institute.

In sum, this set of materials given to the teacher-participants is well-balanced on the issues involved in the technology, economics, and human values of energy utilization in American Society. While we attempted to secure a variety of energy education materials at lower student reading levels, we were limited in achieving this goal due to the very few materials written for high school students with reading problems. The teacher-produced materials in Appendix C (of this Final Report) sought to compensate for this deficiency.

FORMATIVE EVALUATION

Formative evaluation enables the workshop staff to detect deficiencies and correct them before they seriously weaken the progress of the workshop. In addition to being a problem detection device, formative evaluation provides important feedback for the planning and execution of future endeavors with similar target groups.

The Environmental Education Project has devised a useful method of collecting information for this "mid-stream" correction. The formative evaluation instrument was administered to workshop participants twice. The following summaries were made by the Project staff after the instrument was administered enabling problems identified by participants to be corrected.

The original evaluation forms are on file at the Project Office.

SESSION REACTION SHEET

SUMMARY IN PERCENTAGES
(N = 35)

1. How worthwhile has this session been for you personally?

	6	5	4	3	2	1	
Not very Worthwhile				14	43	43	Extremely Worthwhile

What made this worthwhile for you?
Speakers N = 6
Group Discussions N = 6

What limited its worth for you?
Dominance by individuals N = 5
Amount of time N = 6

2. How clear were you about what you were supposed to be learning during this session?

	6	5	4	3	2	1	
Very Confused			9	23	49	20	Very Clear

What, in particular, did you find confusing or unclear?

Nuclear Group N = 4

3. How much audience participation took place in the discussion session?

	6	5	4	3	2	1	
Seemed to be Very Little			14	29	29	29	Seemed to be a Good Discussion

4. Additional comments and feedback:

(SEE NEXT PAGE)

FORMATIVE EVALUATION
June 21 to June 23, 1976

Selected comments from Item Number 4 "Additional Comments and Feedback"

"Enjoy this - hope I can get through all the reading material this summer."

"This is the best workshop I have attended. I am very impressed with the organization of the workshop, the resource persons, the abundance of materials and the very informal and relaxing atmosphere. Upon looking at the agenda, I felt that 8:30 to 3:00 was going to be a bore--quite the contrary!"

"It has been the most relaxing and enjoyable learning situation I have participated in--I have gained knowledge without the anxieties and traumas."

"The members of our group have much to offer each other. Give them a chance."

"Everyone has had amply opportunity to get involved. This is a good workshop in every way."

"I don't feel that the speakers should be attacked on a personal basis. This is a workshop for learning - not a forum for political activities. If I had been a speaker, I would think twice or three times about returning. I feel that this should not be allowed at all. Questions are necessary and good, but personal attacks are not."

"Workshops like this should be made available to more people."

"More of these workshops would be very worthwhile. Perhaps you could do a follow-up later and let the participants discuss what parts they have used."

"Really enjoying it; feel I'm learning a lot."

"Should have had an equally qualified "anti-nuclear person on the panel yesterday. It was far too one-sided."

Some participants were annoyed that a few individuals attacked certain speakers on a personal level; many indicated that the group discussions were dominated by a few. In an effort to correct this situation, discussions were moderated by a staff person.

SESSION REACTION SHEET

SUMMARY IN PERCENTAGES
(N = 38)

1. How worthwhile has this session been for you personally?

	6	5	4	3	2	1	
Not very Worthwhile			3	16	50	29	Extremely Worthwhile

What made this worthwhile for you?

Speakers N = 5
Group Discussion N = 8

2. How clear were you about what you were supposed to be learning during this session?

	6	5	4	3	2	1	
Very Confused			5	13	66	16	Very Clear

What, in particular, did you find confusing or unclear?

3. How much audience participation took place in the discussion session?

	6	5	4	3	2	1	
Seemed to be Very Little		5	5	21	39	29	Seemed to be a Good Discussion

4. Additional comments and feedback:

(SEE NEXT PAGE)

FORMATIVE EVALUATION
June 24 to June 28, 1976

Selected Comments from Item Number 4 "Additional Comments and Feedback"

"I particularly enjoy the discussions."

"The power plant field trip was not very productive because you could not hear what was being said."

"Workshop going great!"

"Great speakers and panels--good and interesting."

"Power plant trip was boring but interesting."

"The field trip to St. Marks was very beneficial."

"All positive."

"Program is going well. The information we have received is tremendous. Keep up the good work."

"Limit the amount of time given to a speaker and then let the speaker lead or generate a group discussion."

"We need a couple of people capable of answering technical questions which remain unanswered or were avoided."

"The emphasis on energy conservation and finding more clean energy sources have been good and useful."

"I enjoyed the field trip--however, our trip was too long."

"I have learned one heck of a lot this week...I needed it."

A number of workshop participants specifically mentioned the field trip to a local oil-fired generating plant. Some were very positive in their evaluation of the trip; others negative. It is difficult to evaluate the utility of the trip with such a diverse group.

Another point of contention that was expressed by several participants was having the "pro-nuclear" and "anti-nuclear" speakers on different days. There seemed to be a general consensus that a "confrontation panel" would have been more beneficial.

4. SUMMATIVE EVALUATION: U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Formal summative evaluation of the workshop was provided by two evaluation instruments. One instrument was supplied by the funding agency and the completed forms were returned directly to them as instructed. The Project staff carefully reviewed the comments made by workshop participants on the ERDA evaluations. The question about "how to improve the workshop" was particularly interesting to us and we are including some direct quotes from the participants in response to this question:

WORKSHOP EVALUATION SHEET: Summary of participant suggestions on "how to improve the workshop"

"More time for teachers to share ideas and a longer workshop to provide for the full development of materials such as multi-media, etc."

"The procedures used in the organization plan were most outstanding."

"It was great! Very effective!"

"I think personally that the workshop was well planned and content covered excellently."

"It was well organized, well planned and thoroughly enjoyable and useful!"

"I think the workshop did an excellent job in the time given."

"Excellent workshop--well planned and executed. Thanks for your efforts."

"Really needed two more days to work, one day more on material development and one day to critique the group's materials - and then revise them."

"It was very well done; the best I have ever attended."

"One week longer, more concise in-depth study, major sources-environmental risks, then a third week of decision-political processes."

"Use of video and cassette tapes so that participants could review materials and react to it."

SUMMATIVE EVALUATION: FLORIDA STATE UNIVERSITY

The second summative evaluation was developed by Florida State University's Environmental Education Project to provide an instrument that would allow for easy summary of data and yet give participants enough latitude to make constructive comments and feedback. This instrument has proven reliable as an evaluation tool during a variety of workshops and with a variety of workshop participants.

Both evaluation instruments collected positive data regarding the entire workshop, the format and the content. The major participant-identified problem was the lack of time. We certainly agree with this analysis but point out that our original proposal requested funding for three-week workshops (See Recommendations section).

Data for this workshop was collected and summarized by the Project staff. The original evaluation forms are on file at the Project Office.

After the data was summarized, percentages were calculated to show the distribution of comments along a scale from 1 - 6. The percentages are useful for all questions except number five where participants often checked several items. The numbers here indicated the number of participants that selected that particular item.

Environmental Education Project
Florida State University
SUMMARY EVALUATION

FINAL QUESTIONNAIRE

IMPLEMENTING ENERGY EDUCATION
June 21 - July 2, 1976

NUMBERS ARE PERCENTAGES

1. To what extent has this program fulfilled your expectations about what you personally might get out of it?

	6	5	4	3	2	1	
Has not come up to my expectations			5	11	55	29	Has exceeded my expectations

a) What exactly has happened that brings you to this conclusion?

Speakers N = 8
Materials N = 2
Group Discussions N = 4
Project Directors N = 3
Organization N = 4

2. Think for a moment about the presentations and discussions in this program. All in all, how would you rate them? (CHECK ONE BOX IN EACH LINE).

	6	5	4	3	2	1	
Only restated or proved what I already knew				21	42	37	Offered new insights, new ways of viewing old problems

	6	5	4	3	2	1	
Missed the important issues, vital concerns			03	16	45	37	Spoke to important issues, vital concerns

	6	5	4	3	2	1	
Hard to understand, complex, full of "jargon"				26	47	26	Clear, understandable

	6	5	4	3	2	1	
Wasn't very useful for understanding today's issues				5	45	50	Provided useful insights of today's issues

3. Where there any points in the program where you had a feeling of sudden insight, of really knowing what it was all about (an "Ah-ha")?

45% No, I was always pretty clear.

3% No, I'm still in a bit of a muddle.

52% Yes. What in particular triggered the insight(s)? Most participants mentioned speakers, especially Art Marshall and David Anthony as being particularly insightful.

4. Were there any points in the program where you had a feeling of complete confusion and/or frustration?

16% No, I felt almost no confusion or frustration.

42% No, any confusion or frustration was cleared up pretty quickly.

42% Yes. What in particular led to that feeling? The nuclear group was specifically mentioned 6 times; the other most frequently mentioned "frustration" was the inability to "tie all the information together."

Has the confusion or frustration been resolved?

N = 11 Yes, how? Group discussions; other speakers; materials

N = 7 No.

5. People attend workshops and courses for a variety of reasons. Please check honestly any of the following reasons that apply to you, and CIRCLE the checkmark of the reasons which were MOST IMPORTANT in your decision to attend.

N = 3 Many others in my group were attending.

My superiors suggested I go.

N = 8 I was invited.

5. Continued

N = 5 My superiors gave me the opportunity to go.

9 I was selected to attend.

19 My attendance was paid for.

25 I came because I really wanted to learn.

3 I'd heard _____

11 I had a particular need to deal with and thought this program would help me.

4 Other (Be specific) CREDIT

_____

_____

6. Now that the program is over, how would you sum up the experience?

	6	5	4	3	2	1	
Not very worthwhile				11	37	53	Extremely worthwhile

Major factors contributing to your assessment:

"Good speakers, good materials, good group interaction and good workshop!"

"The concern for values and lifestyle adjustments. The clarification of energy issues by persons on both sides of the issues."

"A total concept has been presented to me in an area I had very little knowledge. I feel it will assist me as a consumer and a teacher."

"I had no knowledge in the field of energy before this workshop. Through the materials, speakers, and interaction, I have become more aware of the energy question."

"Time well spent, excellent consultants on a variety of orientations -- you have to be more knowledgeable about energy when you leave."

"I feel that now, as a result of the workshop, I will be able to teach energy education in my class."

"The diversity of interests, backgrounds and views expressed and the relaxed atmosphere in which the meetings were handled."

"Very good interaction with guest speakers allowed for clarification of issues."

"I especially enjoyed all of the speakers which provided variety and different perspectives."

"Good speakers and good materials."

"The information received has provided us with the confidence to make intelligent decisions about energy and transfer that knowledge to our students."

"I wish everyone in Florida could have the same experience. I hope I can get my 150 students per year to make their own personal decisions based on information like we received here."

5. RECOMMENDATIONS AND CONCLUSIONS

Recruiting and selection of participants:

--use a direct mail from the Environmental Education Project Office to the curriculum supervisors in Social Studies, Home Economics and Science in each of the target counties. This would enable the applications to receive wider distribution through the various academic disciplines. This year, information and applications were distributed through the district environmental education contacts, who, in turn, distributed the applications to science department chairpersons. This accounts for the abundance of applications from science teachers and relatively few from the other target disciplines of social studies and home economics.

--select qualified applicants on a first come, first accepted basis. Because the Project staff waited until most of the applications had been received, many early applicants assumed they were not accepted and took advantage of other opportunities. By accepting and notifying applicants as soon as possible, this problem will be eliminated.

--explore the possibility of requiring a deposit to be made by accepted applicants. Several accepted participants did not materialize and failed to notify the Project staff. Fortunately, alternates were available, enabling all but two slots to be filled. By requiring a deposit for the part of the tuition that is legislatively mandated, this problem would be reduced.

Workshop Format and Operation:

--most participants felt two weeks was not long enough to obtain adequate knowledge of the subject matter. Our original proposal requested funding for a three week workshop that would enable participants to spend a week "digesting" the knowledge attained during the first week. We recommend returning to that format and allowing more sessions for the content portion of the workshop.

--allow more time for the participants to interact with the guest speakers and panelists. The Project staff feels the major topics in energy were covered but not in the detail many of the participants needed. Future workshops should allow a full day for nuclear energy, and, because of high interest, solar and "alternative" sources of energy.

--structure the curriculum development week to the extent that groups and sub-groups more closely coordinate efforts. There were minor cases of sub-groups generating almost identifical curriculum units; closer coordination would eliminate this duplication.

--mail out specific readings to the participants prior to the workshop. Because of the heavy volume of materials participants received, many were unable to study them effectively given our short time frame. This time frame could easily be expanded by a pre-workshop mailing.

--encourage participants to prepare better drafts of the curriculum units. The editorial task of combining the curriculum units into a functional, cohesive energy education curriculum could have been made considerably easier if more explicit directions were available for each sub-group.

--conduct at least one formative evaluation during the curriculum development phase of the workshop. Due to a staff error, no formal formative evaluation was conducted during the second week of the workshop. This prevented us from making corrections that would have reduced the frustrations of some participants.

--consider a debate with speakers pro and con on specific issues. To provide balance, this workshop had the "pro" persons on one day and the "con" on the next. Many participants felt that the learning experience would have been enhanced if the speakers appeared together.

Workshop Evaluation:

--95 percent of the workshop participants felt that the workshop had exceeded their expectations. The speakers, group discussions and workshop organization were the major factors contributing to this success.

--100 percent of the participants felt that the workshop offered new insights, spoke to important issues and was basically clear and understandable.

--At certain times, 84 percent of the participants felt some frustrations and 18 percent still felt confused at the end of the workshop. The workshop format itself encouraged certain kinds of participant frustration; it made participants think and "sort things out." Obviously, it is taking some participants longer than others to resolve the problems and "put it all together."

--100 percent of the participants felt the workshop was worthwhile overall and most felt it was extremely worthwhile.

Director's Conclusions:

Our original proposal called for three secondary school level energy education workshops. The Energy Research and Development Administration funded us to conduct a pilot workshop during the summer of 1976. The workshop, in the opinion of the participants, the supporting agencies, and the Project staff, was very successful. The participant-produced materials are of a very high quality and can easily be integrated into any secondary school curriculum. These materials will serve as a basis for future workshops and as examples for other teachers and teacher educators.

This pilot workshop will serve as a useful model for additional energy programs in other Florida regions. Supporting agencies such as the Florida Department of Education, the Florida Energy Office and the State University System have indicated a continued willingness to help Florida State University's Environmental Education Project arrange and conduct similar workshops as additional funding becomes available.

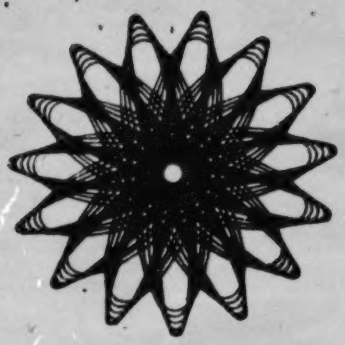
Modifications, such as those listed in the Recommendations, to future workshops will be made based on our experiences with the pilot workshop. However, the overall format and program thrust will remain intact. We are firmly convinced that providing content, curriculum development and teaching skills to inservice teachers is the most successful method of implementing energy education in Florida schools.

APPENDIX A: PUBLICITY

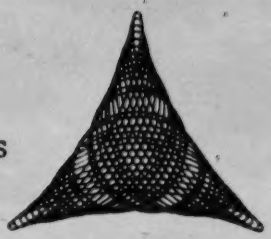
This section contains the publicity materials sent to school leaders, a few of the announcements which appeared in state and national publications, and the pre-Institute materials sent to applicants.

The cooperation of the Florida Office of Environmental Education, its director and regional consultants, was essential to the superb publicity which we received and which helped us to recruit such outstanding participants.

PLEASE POST



FIRST ANNOUNCEMENT!



IMPLEMENTING ENERGY EDUCATION IN FLORIDA HIGH SCHOOLS

The Environmental Education Project, Florida State University, will conduct a two-week credit Institute for forty high school teachers in June. The focus will be upon energy concepts, broadly based facts regarding energy resource alternatives, and teaching-learning strategies for use in high school classrooms. This workshop is funded by the U.S. Energy Research and Development Administration.

Who?: *Forty high school teachers in science, social studies, home economics, consumer education, and environmental education. To be selected from the applicants within the Florida Office of Environmental Education's Areas I and II (Pensacola to Jacksonville), who have the support of their high school principal, and are teaching in science, home economics, social studies, consumer education, or environmental education.*

Where?: *The workshop sessions will meet at the Tallahassee Junior Museum on Lake Bradford, Tallahassee, Florida.*

When?: *June 21 to June 25, June 28 to July 2, 1976. Each daily session will begin at 8:30AM and end at 3:00PM.*

Graduate Credit? *Yes, if a participant wants credit. There are two choices: IDC 522 Trends in Public Affairs for Teachers (4 hours); or IDC 504 Field Workshop in Environmental Science Education (3 hours).*

Instructors?: *Rodney F. Allen and David E. LaHart, plus a series of key energy researchers and educators in Florida.*

Stipend?: *Yes! A $200.00 stipend will be paid to each participant upon successful completion of the workshop objectives. In addition, participants will receive print and hands-on materials for use in their schools. Time will allow for participant-designed teaching ideas for energy education.*

Deadline for Application: *May 15th postmark.*

For additional information and application forms, please contact:
Paul Coley or Jim Philips, Regional Coordinators
Florida Office of Environmental Education
316 Miles Johnson Building
Tallahassee, Florida 32304
(904) 488-6547

-or-

Rod Allen, Environmental Education Project
Florida State University, 426 Hull Drive
Tallahassee, Florida 32306
(904) 644-5769

"In selecting individuals for participation and otherwise in the administration of this program Florida State University will not discriminate on the grounds of the race, creed, sex, color, or national origin of any applicant."

Workshop Format:

Teachers will spend the first week of the Institute reviewing energy and environmental concepts and ideas under the direction of expert consultants. The second week will be spent reviewing existing energy education materials, writing new materials and/or adapting existing materials for instructional use. Curriculum development and evaluation consultants will be available.

Participants will develop materials for use in their own subject area but interdisciplinary approaches will be emphasized.

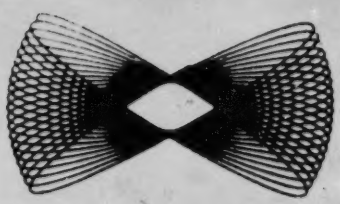
Institute Objectives:

1. Participants will be actively involved in all training sessions.

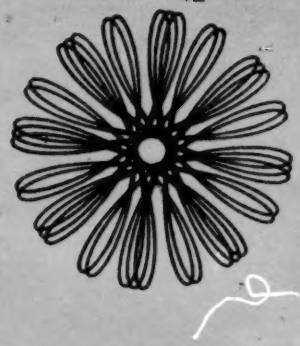
2. Participants will develop curriculum materials suitable for use in their subject area. Materials will involve at least five lessons which have an environment/energy focus.

3. Participants will complete a post-Institute evaluation.

Rodney F. Allen
Science and Human Affairs Program
426 Hull Drive
Florida State University
Tallahassee, FL 32306



ENERGY EDUCATION CREDIT INSTITUTE APPLICATION FORM



Applicant's Name_____

Home Address_____

_____, _____zip_____

Home Phone (AC) _____ - _____

High School Name_____

Address_____

_____, _____zip_____

Phone (AC) _____ - _____

Male* [ ] Female* [ ] White* [ ] Black* [ ] Other*_____

(* See criterion "c" on the back of this form.)

Subjects Taught 1975-76 (or under contract to teach 1976-77)	GRADE LEVEL

School Characteristics: rural ____ urban ____ suburban ____

Percentage Disadvantaged Students: 100-76% ____ 75-51% ____ 50-26% ____ 25-0% ____

Number of Students in your High School: 500- ____ 501-1000 ____ 1001+ ____

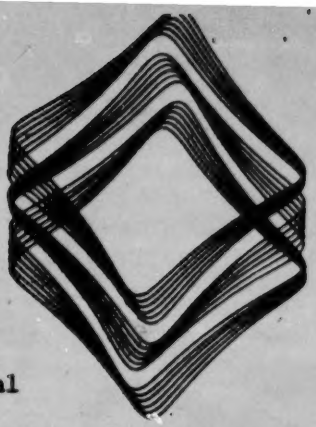
Reason for Wanting to Participate in this Energy Workshop: _____

Deadline: Postmark of May 15th, 1976. Return completed application form to:

Ms Margaret McCollum
Summer Sessions & Continuing Studies
Hecht House
Florida State University
Tallahassee, Florida 32306

_____
Applicant's signature

_____
High School Principal's signature



SELECTION OF WORKSHOP PARTICIPANTS

The regional consultants of the State Office of Environmental Education, in conjunction with the State Director and environmental education contact persons in local school districts, will be responsible for identifying participants for each workshop offered. They will select from high school teachers of science, social studies, environmental education, and home economics.

They will employ the following criteria:

a) support of teachers' school principals and school district administrative staff;

b) distribution so as to involve as many schools as possible in an area;

c) distribution to achieve involvement on a sex, racial, ethnic balance;

d) priority to teachers in low-income and low-student-achievement educational environments; and

e) distribution to achieve a balance in curriculum areas (science, social studies, environmental education, and home economics.)

THE FLORIDA STATE UNIVERSITY TALLAHASSEE 32306

College of Education
Department of Social Studies Education

May 21, 1976

Dear Applicant:

Congratulations! You have been selected from among the many applicants for our Energy Education Credit Institute June 21 to July 2.

The first meeting of the Institute will be at the Tallahassee Junior Museum, June 21 at 8:30AM. You will be receiving a detailed program shortly.

If you are from out-of-town, you might wish to make room arrangements with either of the two residential halls in the area. Osceola Hall, 500 Chapel Drive, Tallahassee, is located on the west side of campus (222-5010) and Cash Hall, 700 N. Woodward Avenue, Tallahassee, is located north of campus (222-0674). There are also several inexpensive motels in the area -- some of which will give commercial rates if requested.

If you cannot attend this Institute, please contact me immediately so an alternate can be accepted.

Please excuse this impersonal communication; I'm looking forward to meeting each of you individually on June 21st.

Sincerely,

Dave

David E. LaHart
(904) 644-5769

426 Hull Drive
Florida State University
Tallahassee, Florida 32306

DEL:ses

The University has agreed to waive all tuition and fees except for the Legislature-mandated $3.35 per hour fee. If you want credit, this is the only fee that you will be responsible for paying.

WHERE?

Tallahassee Junior Museum
3945 Museum Drive
Tallahassee, Florida

WHEN?

June 21 - July 2, 1976

WHO?

40 High School Teachers of Science, Social Studies, Home Economics, and Environmental Education.

AGENDA: NORTH FLORIDA ENERGY EDUCATION CREDIT INSTITUTE

Teachers participating in this credit institute may register for, and earn, three or four graduate credit hours. Since ERDA is bearing the cost of this program, the University will waive all fees except the bond-retirement fee of $3.35 per credit hour per student. Since this fee (better known to some as the "Civic Center Fund") is the result of legislative action, the University cannot waive it.

Rodney F. Allen and
David E. LaHart
Environmental Education Project
426 Hull Drive
Florida State University
Tallahassee, Florida 32306

(904) 644-5769

"BE COOL -- DRESS COOL"

NORTH FLORIDA ENERGY EDUCATION INSTITUTE

PROGRAM

Monday, June 21, 8:30AM Coffee

Values and Energy Education

Dr. Rodney F. Allen, Science and Human Affairs Department, Florida State University

Welcome:

C. Richard Tillis, Director, Florida Office of Environmental Education
Paul Coley, Regional Coordinator, Florida Office of Environmental Education

Workshop Overview and Objectives

David E. LaHart, Environmental Education Project, Florida State University

*** Brown Bag Lunch and Films ***

Concurrent Sessions:

The Energy Computer

Dr. Bruce Nimmo, Florida Technological University

"Ways" to Energy Education

Dr. Rodney F. Allen and David E. LaHart

Adjourn -- 3:00PM

Tuesday, June 22, 8:30AM Coffee

The Florida Energy Office, Functions, Goals and Concerns

Dr. Carlos Warren, Director, and Rosalyn Tillis, Education Specialist

Energy Flow and the Net Energy Concept

Arthur R. Marshall, Ecologist and former Director, Urban Ecology Center, University of Miami

*** Brown Bag Lunch and Films ***

Registration and Fees Collected

Net Energy and Lifestyles - Discussion and Interaction

Arthur R. Marshall and Dr. Rodney F. Allen

Adjourn -- 3:00PM

Wednesday, June 23, 8:30AM Coffee

Nuclear Energy in Florida

Dr. R.H. Davis, Physics Department, Florida State University
Bob Touchton, Westinghouse Electric
J.H. "Jack" Francis, Florida Power and Light
Leon Weaver, Talquin Electric

Discussion and Interaction Session

*** Brown Bag Lunch and Films ***

Petroleum Energy in Florida

Ted Duncan, Florida Petroleum Institute

Discussion and Interaction

Adjourn -- 3:00PM

Thursday, June 24, 8:30AM Coffee

Solar Energy in Florida

Del Ward, Florida Solar Energy Center
Bob Pozzo, Florida Energy Office
Yvonne Moffat, Florida Solar Power, Inc.
Roger Nichols, Solar Energy Consumer and Department of Education

*** Brown Bag Lunch and Films ***

The National Energy Outlook

David Anthony, University of Florida

The Florida Energy Picture -- an Educator's View

Dr. Rodney F. Allen

Adjourn -- 3:00PM

Friday, June 25, 8:30AM Coffee

Consumers and Energy Consumption

Carol Erkert, Santa Fe Community College
Lee Rumbley, Division of Consumer Services
Ann Parramore, Leon County Extension Service
Kitty Funderberk, Department of Education

*** Lunch and Field Trip ***

Visit to the Purdon Power Plant, St. Marks, Florida

Host: Howard Hawthorn

END OF FIRST WEEK'S ACTIVITIES

SECOND WEEK: NORTH FLORIDA ENERGY EDUCATION INSTITUTE

Monday, June 28, 8:30AM Coffee

BREAK INTO FUNCTIONAL GROUPS

Designing Instructional Materials: Staff

Functional Curriculum Models: Staff

Discussion/Interaction Period

*** Brown Bag Lunch and Films ***

Hands-on Experiences with Demonstration Materials

Solar Still
Windmills
Solar Panel

Planning the "manufacture" of student learning materials

Adjourn -- 3:00PM

Tuesday, June 29, 8:30AM Coffee

Florida's Energy Education Materials

Tom Baird, Energy Management Center
Marjorie Ebersbach, Brevard Center for Environmental Learning
Bill Hammond, Lee County Environmental Center
Dallas Maddron, Orange County Environmental Education Project

*** Brown Bag Lunch and look at the materials ***

Education with the Energy Research and Development Administration's Materials: Staff

Group work on material design

Adjourn -- 3:00PM

Wednesday, June 30, 8:30AM Coffee

More Energy Education Materials from the USA: Staff

National Association of Science Teachers
The State of Washington Project
Using Federal and State Publications

*** Brown Bag Lunch and look at the materials ***

Development of Draft Activities (work with functional groups)

Adjourn -- 3:00PM

Thursday, July 1, 8:30AM Coffee

Demonstration of materials and ideas produced to date

Energy and Values Materials

Group work on activities and units

*** Brown Bag Lunch and Films ***

Group work on materials

Adjourn - 3:00PM

Friday, July 2, 8:30AM (AT LAST) Coffee

Energy and Human Values Panel

Bill Ryan, House Growth and Energy Committee
Peter Butzin, Common Cause
William McGill, Leon County-Tallahassee Community Action Program, Inc.
Joseph Jenkins, Public Service Commission

Discussion/Interaction

*** Lunch and Film ***

Demonstration of Participant Produced Energy Curriculum Units

Workshop Evaluation

Roy Herndon, Environmental Resources Analysis Center

Adjourn

APPENDIX B: SOME SAMPLE LESSONS DEMONSTRATED

While many published materials were used with, and given to participants, the materials in this section were designed and used to show how "basic skills" may be incorporated into energy education. Florida schools, like the schools of many states, are under increasing pressure to offer "basic education" or "basic skills." It was our contention that basic skills need a content base and that energy education provides a suitable, indeed admirable, multiple-disciplinary content base for the development of such skills.

SAMPLE LESSON: ENERGY EDUCATION

QUESTIONS OF DEFINITION, FACT, AND VALUE

Remember all of those heated arguments when you were waiting in long lines at the gas station during the "Energy Crisis?" Remember all of the arguments you heard at home, at school, at the office--everywhere(!) about the cause and cures of the problem? Well, all arguments on personal and societal problems engage people's emotions and people ask questions. In order to respond to the questions properly, you need to recognize what the questions are asking for.

There are three main types of questions. Questions of definition -- asking what a word, a phrase, a statement means. Questions of fact -- asking for more information, asking if something is true, or asking if something will happen. Questions of value -- asking if something is good or bad, right or wrong, desirable or undesirable, or if we should or ought to do something.

For questions of definition -- you respond with stipulations of meaning. To questions of fact -- you respond with proof or evidence. To questions of value -- you respond with justifications.

Read each of the following. Put a "D" if it is a question of definition. Put an "F" if it is a question of fact. Put a "V" if it is a question of value. Be prepared to discuss your answers and how you would respond to each question.

___/ 1. Is that an example of solar energy?

___/ 2. Is solar energy a good source of energy for heating water and space in homes?

___/ 3. If we spend more money on nuclear fusion research, will we get results in the near future?

___/ 4. What is a B.T.U.?

___/ 5. How many miles per gallon does a 1977 Pinto get, according to government tests?

___/ 6. Should I buy an electric blanket and a toaster?

___/ 7. What sector consumes the most electricity in Florida?

___/ 8. Do you think that that purchase is desirable or undesirable?

___/ 9. Will that new law save energy?

___/ 10. Should the government help the poor, the rich, and the elderly pay their electric bills?

SAMPLE LESSON: ENERGY EDUCATION

DISTINGUISHING BETWEEN ETHICAL AND NON-ETHICAL QUESTIONS

You have been reading and studying about the energy crisis. Now you know that this crisis, like others, involves a good many questions which need answers.

Some of the questions need ethical answers--decisions about what is desirable, good, honest, kind, proper, etc., decisions about what should be done by individuals, groups, and societies.

Which of the following questions require ethical decisions? Mark them with an "E" and be prepared to discuss your choices.

__/ 1. How can we solve the energy crisis?

__/ 2. How should we solve the energy crisis?

__/ 3. Should the United States import more oil from the developing nations?

__/ 4. If we produce more energy from solar sources, will the price of electricity go down?

__/ 5. During an energy crisis, should Texas share its natural gas with other States?

__/ 6. Should I buy a solar hot water heater?

__/ 7. Do I have a choice between gas or electric heat for my new home?

__/ 8. How much oil was produced in Florida last year?

__/ 9. Given apartheid in South Africa, should we buy low-sulfur coal there to get clean energy in Florida?

__/ 10. If I have the dollars to burn, isn't it OK for me to use my gas lamp in the front yard?

__/ 11. Does Gerald Ford want to own an electric car?

__/ 12. If we develop western coal fields, will that end the energy shortage in the United States?

__/ 13. What is the relationship between gasoline consumed and oil company profits?

__/ 14. Can you get energy from the oceans?

__/ 15. Is it right to consume so much electricity to attract customers into stores to buy junk foods?

SAMPLE LESSON: ENERGY EDUCATION

Argumentation: Basic Skills

1. For persons just learning to make systematic value judgments and to justify their decisions, a basic pedagogical strategy involves asking them to list two or three good reasons to support their judgment.

My Position: _____

Three Good Reasons: 1. _____

2. _____

3. _____

Take a position on the following issue. Write your position and three good reasons supporting your position in the above form. Then, write out your argument in a paragraph: position statement as the topic sentence and the reason statements in subsequent sentences.

"Should the Federal Government build nuclear fission power plants to provide low cost electricity to all cities of over 500,000 population?"

2. Go to your local newspaper or to a news magazine. Locate a brief position statement on an energy-related issue. Paste it here or on the back of this page, then, analyze it using the following form.

Persons might analyze simple position statements by others, asking "What is the author's position? What reasons does she offer to support her position?"

Position: _____

_____

Supporting Reasons: 1. _____

2. _____

3. _____

4. _____

SAMPLE LESSON: ENERGY EDUCATION

Argumentation: Basic Skills

The first process teaches that value judgments need to be justified. The second process involves the statement of reasons for and against a particular decision or position and the factual and value assumptions the decision-maker is using. Persons might use this process to analyze their own decisions and justifications. Or they might analyze others' arguments, explicating factual and value assumptions.

Position: _____

_____

Reasons Supporting Decision:

R1 _____

Assumption: _____

_____

R2 _____

Assumptions: _____

_____

_____

1. Take a stand on the following issue and write your argument in the form above. Be careful in setting forth your assumptions and label them -- F "factual" or V "value."

   "Should utility companies promote the increased consumption of electricity in the 1970s?"

2. Use your local newspaper or a news magazine to locate an argument on an energy issue. Paste the argument (paragraph) on the back of this page, and analyze the argument using the form above.

*Reprinted from the Tallahassee Democrat, Sunday, April 25, 1976, p.4-A.

State the Implied Issue	Write a non-ethical question about the issue	Write an ethical question about the issue

Application: Clip three articles on energy issues from your local newspaper. Mount each on a separate piece of paper. Then, under each article perform the same analysis that you did in the above exercise.

SAMPLE

*Reprinted from the Tallahassee Democrat, Tuesday, April 27, 1976, p.4.

State the Implied Issue	Write a non-ethical question about the issue	Write an ethical question about the issue

Application: Clip three articles on energy issues from your local newspaper. Mount each on a separate piece of paper. Then, under each article perform the same analysis that you did in the above exercise.

SAMPLE LESSON: ENERGY EDUCATION

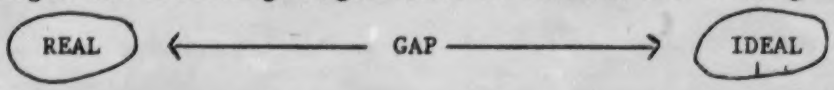
PROBLEM DEFINITION

Listening to the electronic media (radio and TV) and reading the newspaper, we are continually bombarded with one "problem" after another — the reading problem; the energy problem; the bussing problem; the civil rights problem; the defense problem; the pollution problem, the transportation problem, etc. But what is a "problem?" Write out your definition:_____

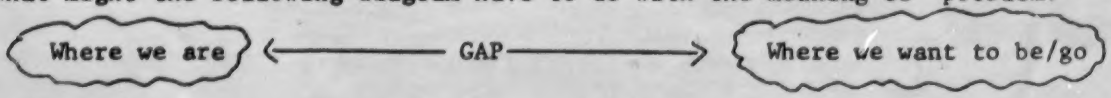
_____

_____

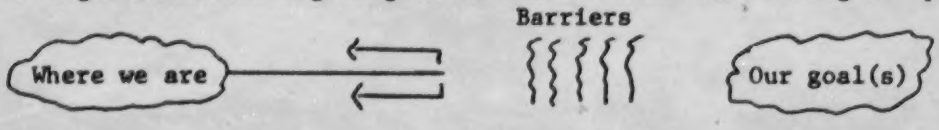
A. What might the following diagram have to do with the meaning of"problem?"



B. What might the following diagram have to do with the meaning of "problem?"



C. What might the following diagram have to do with the meaning of "problem?"



D. "How can we/how should we get from where we are to where we want to be (goals)?" THAT IS A CENTRAL QUESTION. WHEN PEOPLE TALK ABOUT AN ENERGY PROBLEM, WHAT DO THEY MEAN?

_____

_____

_____

_____

SAMPLE LESSON: ENERGY EDUCATION

Imagine that you are one member of a group which wants to affect energy consumption, pricing, or conservation in your community. The group has decided to conduct a campaign to do something like the following. You agree with the campaign idea.

--Promote the use of public transportation over private automobiles
--Secure real estate tax advantages for homes with solar heaters (water and space heating)
--Obtain an electric rate schedule that favors low energy use consumers
--Use the building codes to compel well-constructed, insulated public and private buildings which are energy efficient.
--Ban the use of oil from Arab nations which participate in the conflict against Israel
--Ban the rezoning of coastal lands for support bases for off-shore oil drilling
--Block the construction of an oil refinery near the city limits

Do a community power analysis. The diagram on the back of this page offers some ideas. Who has the power that you need? Information and skills; workers and supporters; opinion-leaders and legitimatizers?

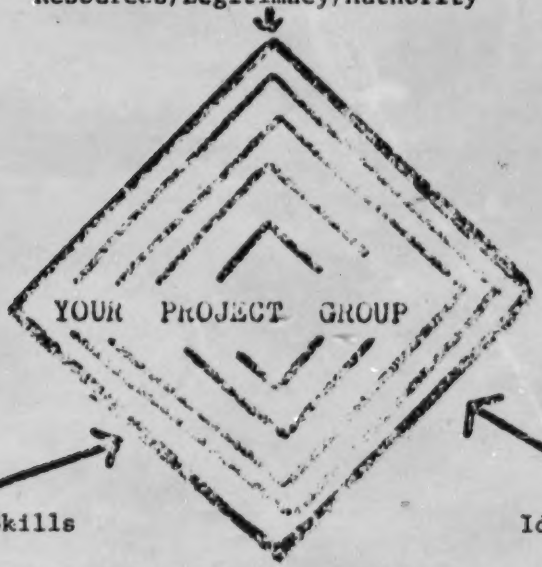
1. What information and skills do you need?	Who has the information and skills?
2. What work and support are required?	Who has workers and supporters friendly to your project?
3. Who are the important union-leaders and legitimatizers in your community?	Who among them are friends or can be persuaded to endorse the project?

ALLIES

Prestige Figures: religious leaders, college president, labor leader, war hero, old established families, lawyer, civic leader, politician, etc.

Power-Opinion Leaders: Many of the above, agency heads, wives, artists, scholars, newspaper editors, mayor, chamber of commerce leaders, businesspersons, lay, religious and civic leaders, broadcasters, etc.

Resources/Legitimacy/Authority



Information/Skills

Ideas/Power-Base

CONSULTANTS

--Agency personnel: local, State, federal
--Teachers and college scholars
--Union organizers and minority leaders
--Political ward chairpersons
--Chemists, engineers, and other scientists
--Librarians and historical society personnel
--etc.

OTHER GROUPS

--P.T.A., Sierra Club, Rotary
--Church Women United, Girl and Boy Scouts, Boy's Club, Lions
--Garden Club, Isaac Walton League, Environmental Action Groups, Audubon chapters
--Minority groups, civic associations
--Ad Hoc groups
--etc.

YOUR GOAL	THE OPPOSITE OF YOUR GOAL
Forces blocking or driving against the achievement of Your Goal	Forces supporting the achievement of Your Goal

Now you have got several things to do:

a) Where are the strengths of your team? What are the weaknesses of their team? (What do you have going for you? What's going against you?)

b) Your old football coach could only play with 11 persons at a time. You can play with more! How can you strengthen your team? Add more players? Strengthen the power of the players you have? Get more allies cheering in the stands? Get good press and public relations (super cheerleaders)?

c) How can you weaken the strength or take advantage of the weaknesses of the other team? Draw plays? Quarterback sneak? Bomb? Bootleg? Foul? Psyche-out?

Why don't you try the idea of force-field analysis on an energy problem? Use one of the two examples on the first page: [1) The Governor of Florida case or 2) the school principal.] Do a force-field analysis for your governor or your principal.

SAMPLE LESSON: ENERGY EDUCATION

FORCE-FIELD ANALYSIS

> When I was a boy I used to swim in the Indian River Inlet. There the outgoing water from the bay met the incoming surge from the ocean, the currents were swift and the waves wild and irregular. Many people lost their lives in these waters, and the inlet was rightly considered extemely treacherous. However, having survived the folly of repeated swimming in dangerous tides, I can now see that I learned something. The outgoing currents were too swift to swim against, but if you would only yield to them they would carry you to a point beyond the inlet, where it was possible to swim crosscurrent and come back to shore in the calm waters to the lee of the jetty. When swimming in turbulent waters, wisdom lies in knowing when to relax and when to struggle.
>
> -- Sam Keen *

As one works to solve or to manage community problems, one needs not only to know when to relax and when to struggle -- one needs to know where to push, when to pull, and when to leave well enough alone!

Let's assume that you are interested in energy conservation and you want to reduce a certain group's consumption of energy. What do you do? Where? When? How?

1) *The governor of Florida wants to reduce electric energy consumption in houses -- especially for water heating. What is his/her most effective strategy for doing that?** How do you know?*
2) *The principal of a high school wants everyone to turn off the lights when a classroom is not in use. What is his/her most effective strategy? How do you know?*

There is a rather clever way to figure out effective strategies. It is called "force-field analysis." Imagine a football game with its offense and defense. The job of the offense is to support the goal of the team -- to get the ball over the goal-line. Meanwhile, the defense is blocking that objective. The defense is trying to push the offense away from its objective.

Well, in working to solve community problems you have goals which you are trying to achieve. You have persons and groups trying to help you. But you also have persons and groups which are blocking you from achieving your goals. The smart problem-solver, like the successful football team (and coach), needs to figure out who is supportive and who isn't, who is helping and who is blocking, and what are the strengths and weaknesses of our situation which will help us to achieve our goals. That makes sense, doesn't it?

Football players and coaches diagram their plays with Xs and Os. In force-field analysis you will use words and arrows. First, you write down your goal... and the opposite of your goal. That's like looking at a football field and knowing what end is your goal and what end is your opponents' goal! Next, you need to see who is on your team--what forces (people, groups, etc.) are your supporters and allies. And, who are your opponents (Who plays for "them?")?

*Reprinted from his Apology for Wonder (New York: Harper & Row, Publishers, 1969).

**Here we are considering only the most effective way--not the most ethically acceptable way. The ethics of this will be another topic for another time!

R.F. ALLEN
Values Education

FIVE KINDS OF POWER (or EXTERNAL INFLUENCE) IN DECISION-MAKING SITUATIONS

In decision-making situations, individuals and groups often feel the influence of others. This influence is the expression of other persons' power. Power is defined here as influence, one party getting another party to think, believe, or do something that the second party would not have thought, believed, or done

1) Give two more examples of each type of power, from your own experience in decision-making situations.

2) Examine a decision someone else made recently (e.g., a friend, a judge, a State or provincial legislature). What kinds of power were operating in that situation?

3) Reflect upon a decision-making situation in which you recently participated. What kinds of power (from what sources) influenced your participation and decision?

COERCIVE -- Power based upon the ability to give or to withhold punishment, either real or imagined by those potentially affected.

example: "There is a $100.00 fine for dumping here. We might get caught." "I can't drop litter on the trail, because the teacher might once more embarras me before the class."

REWARD -- Power based upon the control of scarce resources desired by others, coupled with others' expectation of a positive result from gaining access to those resources.

example: "If I do this, I will get a salary increase." "If you vote our way on the Clean Air Bill, we'll provide campaign funds."

REFERENT -- Power based upon others' desire to identify and/or associate with significant others or symbols, and the ability to control access to those others or symbols.

example: "You must do these deeds in order to join our group." "We can gain his support by inviting him to our club Saturday night."

LEGITIMATE -- Power based upon the ability to make another person, act, policy, program, or organization respectable and worthy of loyalty, and power based upon others' viewing a person, office, or system as worthy by achievement, ascription, or promise.

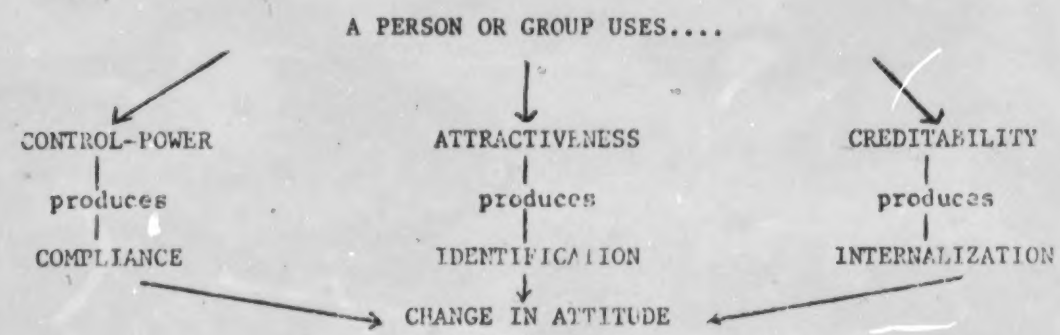
example: "This new social program is supported by the priest and the professor!" "The Byrds, our first family, looks with favor upon the governor and his policy."

EXPERT -- Power based upon others' perception of a source of information, skill, knowledge, or wisdom as creditable and authoratative.

example: "Ninety-nine scientists support breeder reactors for the generation of clean electric power." "Dr. Baum and his colleagues have considered this problem and their position and supporting arguments are convincing."

SAMPLE LESSON: ENERGY EDUCATION

Herbert C. Kelman of Harvard University did research asking, "How do attitudes change?" In answer to his question, Kelman discovered three processes of attitude change. The three processes are "Compliance," "Identification," and "Internalization."*



Compliance occurs when an individual or group accepts the influence of another person or group, hoping to achieve a favorable reaction from that person or group, or to avoid an unfavorable reaction. For example, a person might wash the dishes because he wants to use the family car and his mother controls the keys and wants the dishes washed. His mother has power to get compliance by her control of significant rewards and punishments. Here attitudes are shaped by external rewards.

Identification occurs when an individual or group accepts the influence of another person or group because they want to maintain or establish a satisfying relationship with that person or group. For example, a person might imitate or model Joe Namath's style of clothing to fantasize about "me and Namath." A person might buy a certain type of car as an expression of identification with a group. The Lincoln Continental says, "I am a member of the club. I have it made in America." A person might buy a solar hot water heater because Janet and Harry have one. Mary might enroll in an ecology course because of the teacher's personality and bearing.

Internalization occurs when an individual or group accepts the influence of another person or group because the content of that influence (the ideas and ideals offered or the actions suggested) are intrinsically rewarding; that is, the ideas and actions are believable given what the person or group believes and are acceptable given what the person or group needs or values. For example, a person might be persuaded to accept a racist position on school bussing because it looks reasonable to him, given his perceptions, needs, self-image, concerns, etc. Another person might employ new farming techniques because the research data makes sense and helps him to reach his goals: increased income and soil conservation.

In order to pursue strategies based upon compliance process, energy-activists would have to manipulate significant rewards and punishments to get others to accept to do what was desired by the group. "Pass a law to get everyone to

*Herbert C. Kelman, "Compliance, Identification, and Internalization: Three Processes of Attitude Change," Journal of Conflict Resolution, Volume II (1958), pp. 51-60.

install solar water heaters or be fined." "Give out Presidential Environmental Merit Awards in a program to get people to insulate their homes." "The electric rates are unfair. Let's get at least 50% of the customers to refuse to pay their bills."

In order to use the identification process, energy-activists would have to enhance their reputation and attractiveness, or recruit members and allies with such attractiveness as to get others to perceive them (and/or their goals) as just and legitimate.

In order to use the internalization process, energy-activists would have to present rational arguments and the facts to others in order to induce a change. It should be remembered that to the person or group which is to change, the argument and the facts only have to seem creditable. Attitudes are shaped by the perception of creditability (not the validity). One can imagine a person who supports the NASA space program because he loves cheese and thinks that travel to the moon will bring down the price! The racist at a Klan rally and the industrialist at a convention may be accepting "facts" and erroneous conclusions from speakers.

Let's assume that you are in one of the following roles with the objective stated. Which of the three attitude change strategies would you choose? Why?

ROLE	OBJECTIVE
a teacher.	Save energy at school.
a governor.	Save electricity in government offices.
a President (U.S.A.).	Save on imported oil.
a social worker.	Get support for lower electric rates for senior citizens.
an oil company president.	Get tax credits to explore for oil.
a concerned citizen.	Get people to buy little cars which use less gas
a car manufacturer.	Get people to buy electric cars.

SAMPLE LESSON: ENERGY EDUCATION

As a person concerned about energy affairs in your community and in the nation, you want to work with a group of citizens to get them to change their behavior which affects energy use. Specifically, you want them to:

1) consume less energy;
2) work to change the price structure of electric power so you pay more per Kilowatt Hour as you consume more electric energy.*

--Which will be easier to accomplish with most groups? 1 or 2. Why?

--Which of the following will be easiest to accomplish — that is, take less time to accomplish? (Rank order, 1 for less time; 4 for most time). Be ready to explain your rank order.

___/ Knowledge about the price structure
___/ Action by the group of people or rate strucutre
___/ Attitude toward electric rate structure
___/ Personal action on rate structure

--Examine the following diagram. What does it tell you about the time factor involved in changing knowledge, attitudes, and behavior of individuals and groups? What does it tell you about the involvement of people in such changes? **

--Define the following in your own words:

attitude	knowledge	behavior
change	Kilowatt Hour	consume

--If you wanted your class to do #1 or #2 above, what would you do? Use your insights from studying the above diagram.

*Now, in most places, the cost per Kilowatt Hour goes down the more electricity you use.

** Paul Hersey and Kenneth H. Blanchard, Management of Organizational Behavior, Utilizing Human Resources (Englewood Cliffs,N.J.: Prentice-Hall, Inc., 1972),p. 2.

SAMPLE LESSON: ENERGY EDUCATION

MOTIVES FOR CONFORMING TO A RULE

Why do people conform to a value/moral rule? What motivates them to conform to a value/moral rule? The following "reasons" are drawn from the model of cognitive model development set forth by Lawrence Kohlberg.

a) Think about a value/moral rule such as "Do not steal," or "Tell the truth, live honestly and openly with lucidity." Are the reasons for conforming to such rules covered by the following alternatives? If not, add some.

b) Imagine a rule such as "Conserve energy whenever possible." Or "Do not waste energy from non-renewable sources." Or "Whenever possible use primary energy, not secondary energy (electricity)." Reflect upon the diverse motives that people would have for conforming to such a rule. Give examples for each of the following kinds of motives.

1. Obey rules to avoid punishment (real or imagined) from a source with the power to punish.

2. Conform to a rule due to perception of personal benefits.

3. Conform to a rule to avoid disapproval from significant others, or to gain the approval of, or identification with, significant others.

4. Conform to a rule because one perceives the rule (and the personal and social consequences of following it) as legitimate and wants to avoid censure by self (guilt) and by accepted legitimate authority.

5. Conform to a just rule in order to maintain one's sense of obligation to others in the web of social reciprocity (community welfare).

6. Conform to a just rule to avoid self-condemnation.

SAMPLE LESSON: ENERGY EDUCATION

SOCIAL CHANGE THEORIES

Let's assume that you want to change the way people in our society produce, distribute, price, or consume energy. You are now a potential social change agent. You will need to build a social change strategy.*

Building a social change strategy involves understanding how societies and individuals change. The selection of a strategy is a reflection of one's beliefs about how change occurs in societies. Scholars have identified three basic theories of change processes, which may be described, if oversimplified, as follows.

I. Power-coercive process. People in our society are caught in huge, complex social institutions which cause and perpetuate the basic problems of the social and environmental order. To deal with them and to cause change, persons must organize, control rewards and resources, and compel change. For government and public institutions this means mustering votes and influence as pressure. For individuals it means exerting controls and manipulating rewards. For private groups it means developing a countervailing force (e.g., organize consumers against power companies). The essence of change is power.

II. Normative re-educative process. If you want to solve social problems, the basic difficulty lies with social values. People need to examine the facts and reflect on their values and social expectations. Change agents must raise the consciousness of others: What are the problems? What is wrong with this or that? They need to teach the skills of dealing with problems and with social institutions (e.g., government, business). This endeavor will lead to the solution or resolution of problems and conflicts.

III. Rational-empirical process. People will change their beliefs and behavior and will change their social arrangements if one simply presents the facts clearly in a rational argument. People want to do "good," they just need information and rational discourse to chart the way. If you want to get people to change social arrangements to affect solutions of eco-problems, you need accurate information, solid arguments, and a forum for a dialogue with others.

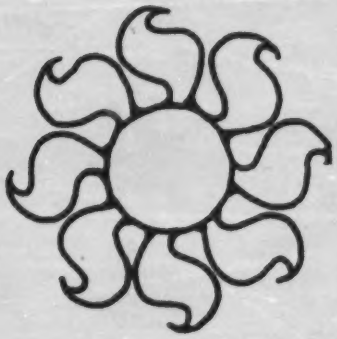
a) If you wanted to change energy production, distribution, pricing, or consumption in Florida, what would you do? Why? Which of the three social change theories are you advocating? Why? What does that tell you about your attitudes toward the society, its people and their habits?

b) Use your newspaper or library to locate energy-related social change proposals advocated by groups, government, or individuals. Read each proposal carefully. Which change process is implied by each proposal? What does that tell you about the person, group, or agency making the proposal?

*These categories of change are drawn from the work of Kenneth Benne, Warren Bennis, and Robert Chin, The Planning of Change (New York: Holt, Rinehart & Winston, Inc., 1961).

FLORIDA ENERGY ACTIVITIES

SAMPLE CLASSROOM ACTIVITIES
FOR LEARNING ABOUT ENERGY
IN FLORIDA



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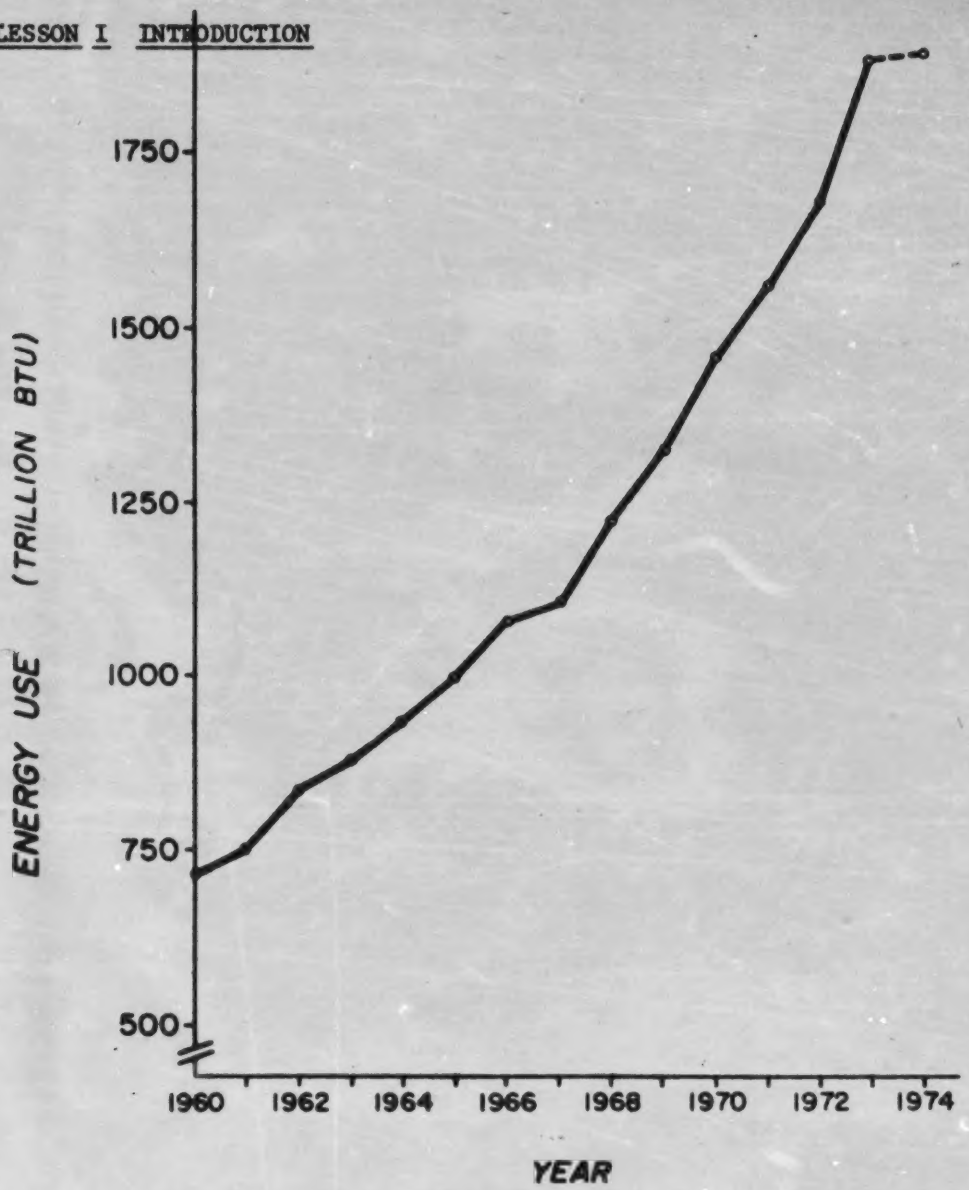
A NOTE TO TEACHERS

The activities presented in this little booklet are merely samples of classroom learning activities which can be put together quickly - often from existing governmental reports. They can be effective for energy education. Notice that each activity involves students in pursuing multiple objectives - knowledge, basic skills, inquiry and reflection, decision-making, problem identification, value clarification, action, etc.

The model which we use for energy education involves the following components:

Four Basic Questions	Four Basic Components
WHAT?	AWARENESS
What's going on here?	[Personal Experience, Information] [Experience and Information Seeking Skills, Problem Identification Skills]
SO WHAT?	MEANING
What sense do I make of what's happening? What does it mean to me? To others?	[Knowledge: Personal, Conceptual, and Empirical] [Reflective Inquiry Skills]
FOR WHAT?	VALUE
What evaluation do I make of what is happening? What do I want to happen here? Why?	[Personal/Societal Commitment] [Reflective Goal-setting, Decision-making Skills]
NOW WHAT?	ACTION
What can I do to make happen what I want to happen here? What do I need? etc.	[Personal/Group Behavior] [Social Participation and Strategy-building Skills]

[The compilers of this set of instructional activities wish to thank Dr. Stanley Crowe, Florida Energy Office, Tallahassee, for his assistance in locating the reports used in these activities.]



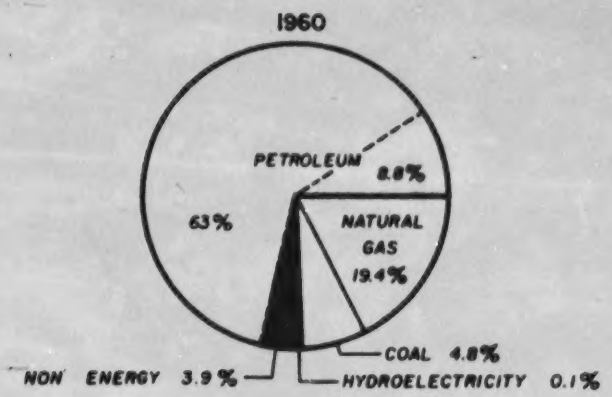
Energy use in Florida for 1960-1974.

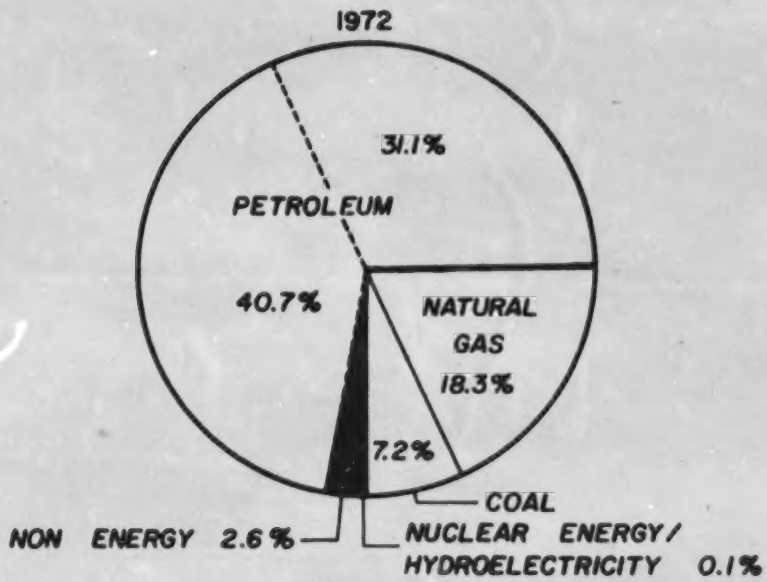
Phase A: Examine the display above. What does this say to you?

Phase B: Discuss with the teacher and others what you want to know (e.g., How much is a trillion? What is a BTU?). Remember that this chart does not include petroleum products used for non-energy purposes, such as asphalt for roadways and lubricants for vehicles.

Phase C: What does the data above mean to you? Does it tell you anything important about your past and present? Or for your future?

Does the data suggest any personal or social problem? How? Why? Why not?



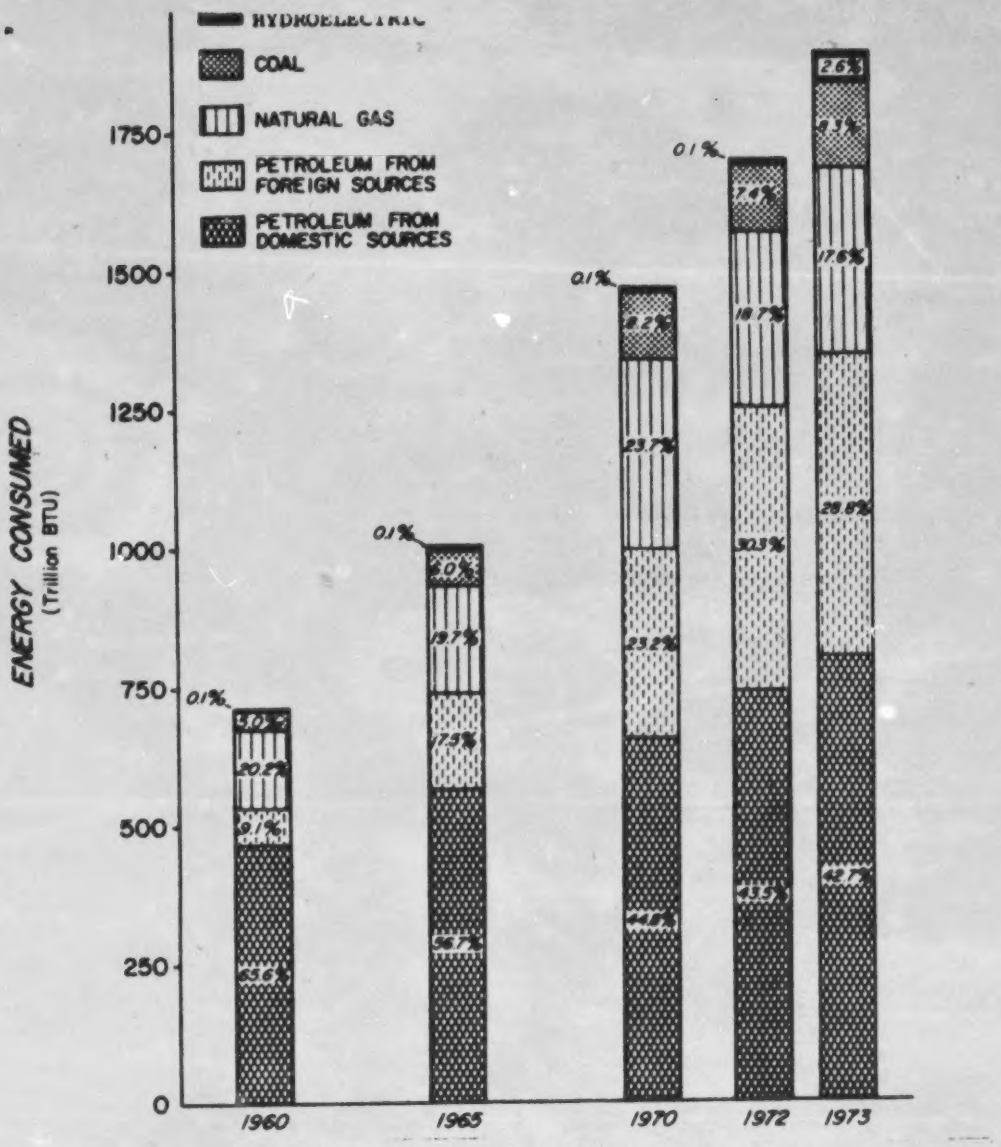


Energy consumption in Florida by fuel type and by domestic and foreign sources for 1960 and 1972. *(Drawing by Florida Resources and Environmental Analysis Center)*

Phase A: Write out your definitions for energy, BTU, and non-energy, as used above. Share your definitions with others.

Phase B: The display above shows energy consumption in Florida for two time periods. What changes do you detect between the two time periods? What changes are significant to you? Why?

BTU (British Thermal Unit). A unit of energy equal to the energy required to raise the temperature of one pound of water 1° Fahrenheit.

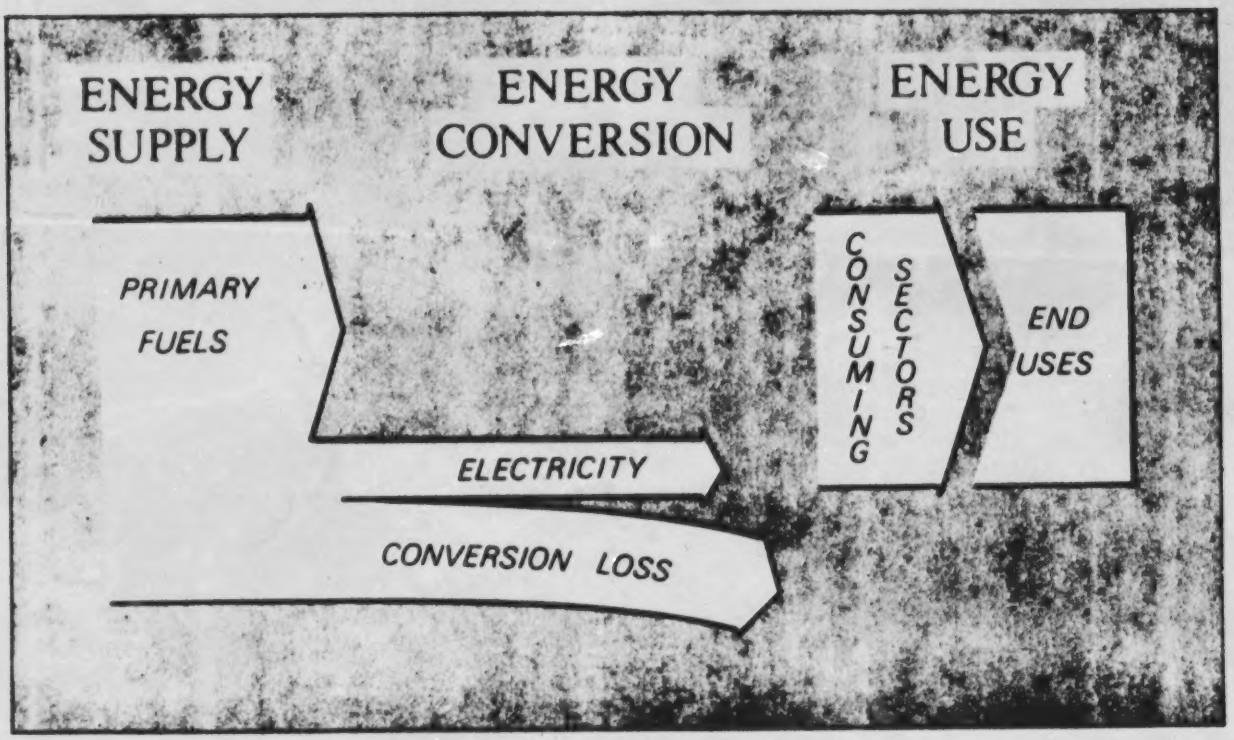


Energy consumption in Florida by energy type and by foreign and domestic sources, 1960-1973. *(Graph by Florida Resources and Environmental Analysis Center)*

Phase A: This chart shows similar data to those in the previous chart. Compare the two charts for the 1960 and 1972 time periods. Do the changes which appeared on the first chart (for 1960 - 1972) also appear here?

Phase B: When it comes to energy sources in Florida, is there anything which surprises you? What? Why?

NON-ENERGY USE. Use of fuels for other purposes than production of energy. Non-energy use includes natural gas use as chemical feedstock and use of petroleum products such as asphalts, lubricants, and road oils.



Phase A: Examine the diagram above. Can you make sense of it? What is it saying to you? What does it mean to you? Share your answers with your teacher and with others.

Phase B: Examine the diagram again. Define "Primary Fuels," "Conversion Loss," "Consuming Sectors," and "End Uses."

Here are some examples:

Coal (primary fuel) Water heating (end use)
Residential (consuming sector) Crude Oil (primary fuel)
Oil to Electricity (Conversion loss)
Air Conditioning (end use) Industry (consuming sector)

Phase C: Compare the diagram above and what it tells you with:

Your body?
Your honda?
Your bedroom light bulb?

FUEL. Any material utilized as a source of energy.

SECTOR. A subclassification of all consumers, such as residential, commercial, or industrial users, employed to subdivide the total economy for more detailed examination.

LESSON II : ENERGY SUPPLY

Florida's oil and natural gas production began with the discovery of oil on September 26, 1943 in the Sunniland oil field located in Collier County. Since that time seven more fields have been discovered in south Florida and three have been discovered in north Florida. Through March 31, 1975 120,355,052 barrels of crude oil have been produced by these twelve fields. A list of these fields and the counties in which they are located are given below:

Bear Island Field in Collier County
Blackjack Creek Field in Santa Rosa County
Forty Mile Bend Field in Dade County
Jay Field in Escambia and Santa Rosa Counties
Lake Trafford Field in Collier County
Lehigh Acres Field in Lee County (incorporated with the West Sunoco Felda Field on January 1, 1975)
Lehigh Park Field in Lee County
Mt. Carmel Field in Santa Rosa County
Seminole Field in Hendry County
Sunniland Field in Collier County
Sunoco Felda Field in Collier and Hendry Counties
West Sunoco Felda Field in Collier, Hendry, and Lee Counties

All these fields are currently producing oil with the exception of the Forty Mile Bend field which was abandoned in September, 1955.

Because of the lack of refineries in Florida, all the crude oil produced in the State is exported to other states for refining. Crude oil produced in south Florida is transported to Port Everglades, Florida by a pipeline operated by the Sunniland Pipeline Company. The crude oil is then barged to various Gulf states for refining. The oil produced in north Florida is piped to Mobile, Alabama by the Exxon Pipeline Company. Florida's only refinery, Seminole Asphalt Refining, Incorporated in St. Marks, imports all its crude oil from outside Florida.

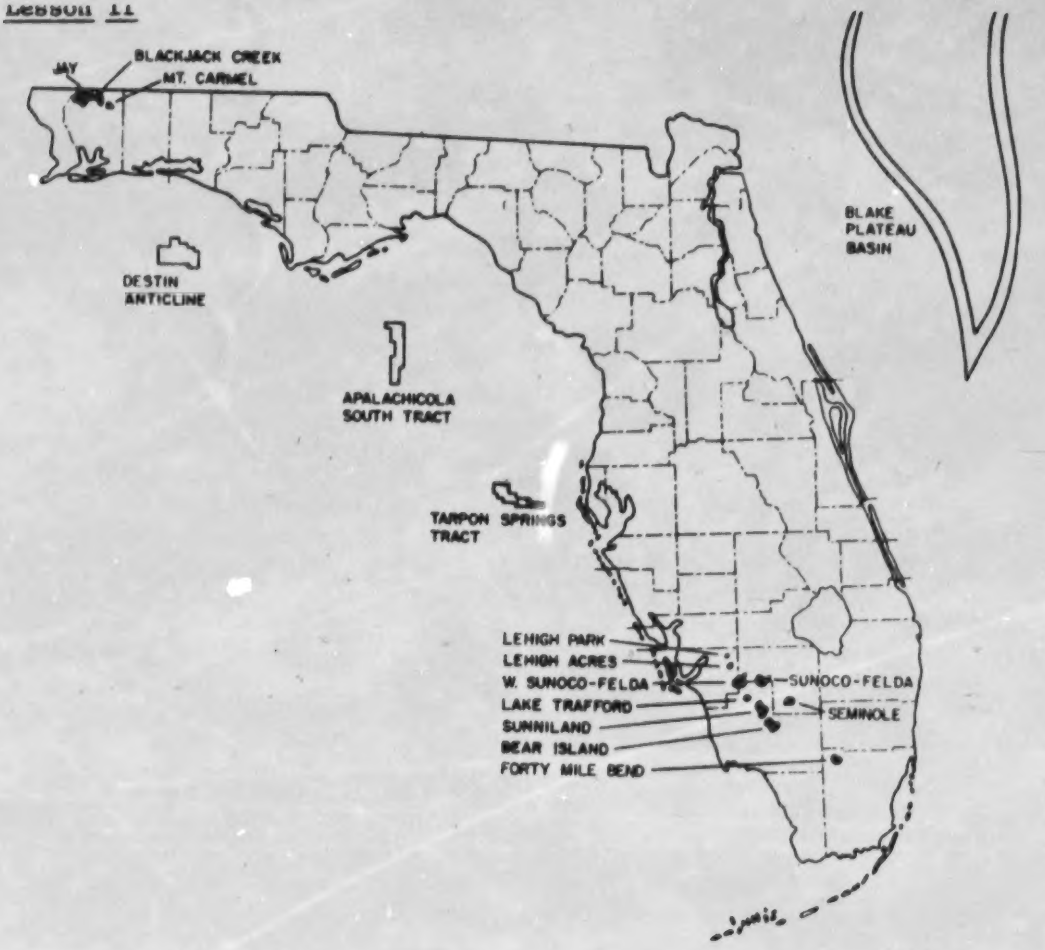
Florida has no natural gas wells, but natural gas is produced by nine fields in association with crude oil. Only the gas produced from the Jay field is marketed commercially, and this is transported by pipeline to Pensacola, Florida by Five Flags Pipeline Company. The gas produced by the other fields is consumed by field operations, usually as a pumping fuel. Prior to 1964 natural gas production was not reported because of its unimportance in relation to crude oil production, and because of its insignificant commercial value. Since that time, 102,236,547 thousand cubic feet of natural gas production has been reported.

CRUDE OIL. Natural petroleum as it is produced from the earth, consisting primarily of hydrocarbon compounds.

GAS, NATURAL. A mixture of gaseous hydrocarbons, chiefly methane, produced from accumulations in geologic formations.

PETROLEUM. The class of naturally occuring liquid hydrocarbon products produced from organic accumulations trapped in geologic foundations.

ENERGY SUPPLY



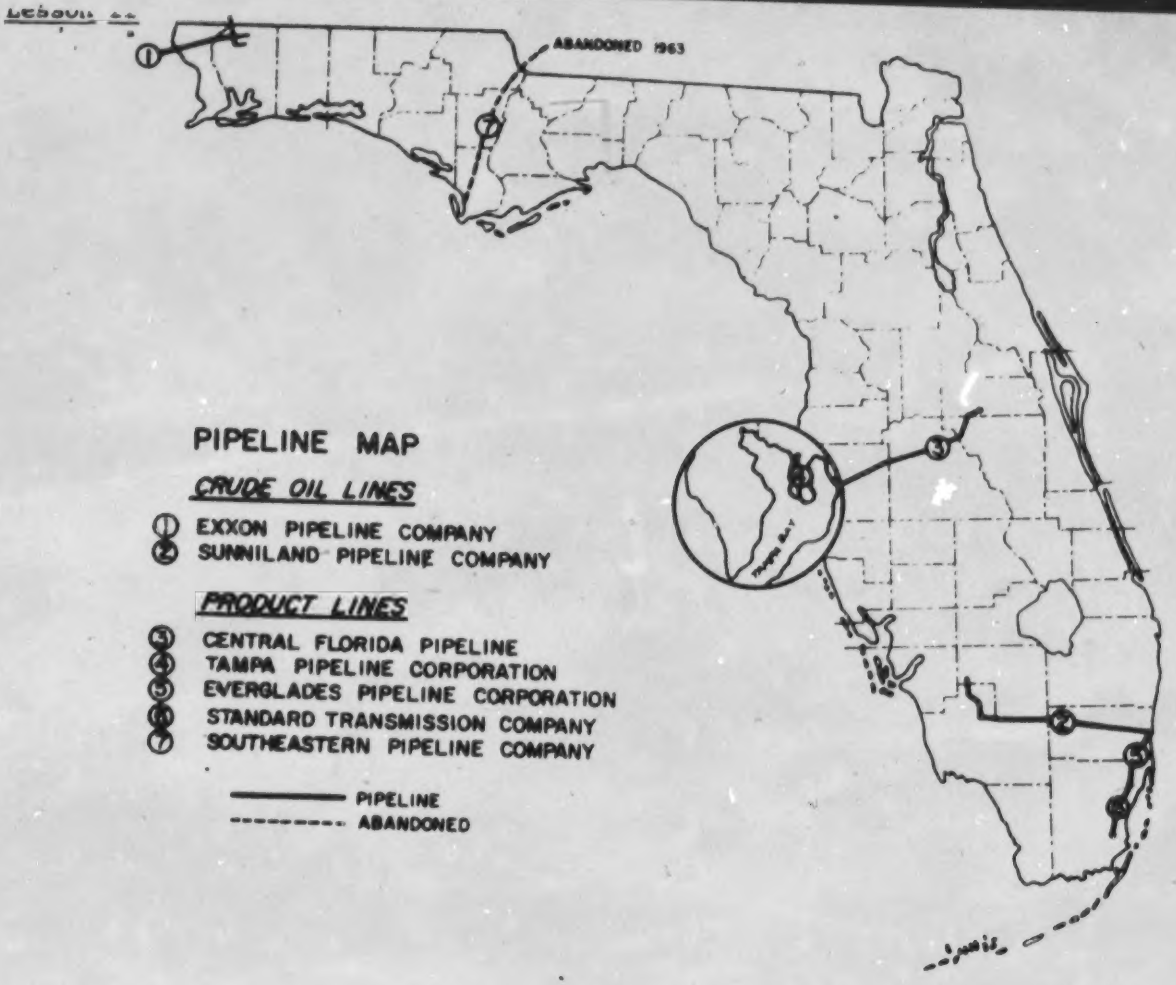
Existing and potential areas of petroleum production in Florida. *(Map by Florida Resources and Environmental Analysis Center)*

Phase A: Read the first sheet in this lesson. Note words which you do not know. Work with your teacher and others to master these words.

Phase B: Examine the above map carefully. Would you have oil wells in your county, if you lived in

Leon County?	Dade County?	Santa Rosa County?
Duval County?	Collier County?	Lee County?
Bay County?	Pinellas County?	Orange County

Based on the limited evidence you have, do you think that Florida's oil fields produce all of the crude oil consumed in this State? Why? Why not?

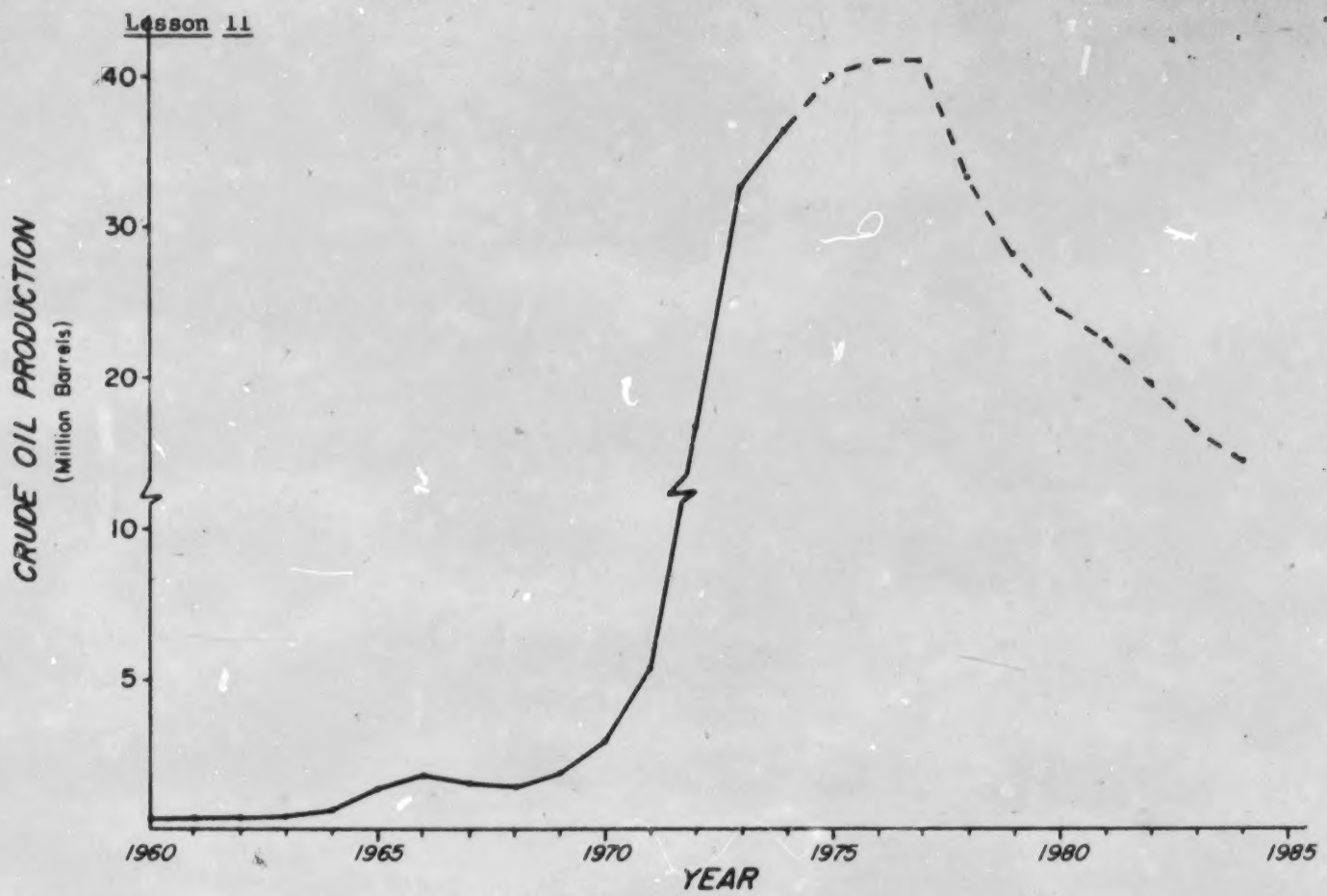


Florida. Petroleum product and crude oil pipelines in *(Map by Florida Resources and Environmental Analysis Center)*

Phase A: The abandoned pipeline runs from Port St. Joe through Atlanta and into Tennessee. We can disregard that pipeline.

In your opinion, what is the difference between a "crude oil pipeline" and a "product pipeline?"

Look at each pipeline on the map. Where does each begin and where does each one go? Does this suggest what the pipeline might carry? If so, what does each carry?



Source: Florida Bureau of Geology

Crude oil production from existing fields in Florida, 1960-1984. *(Graph by Florida Resources and Environmental Analysis Center)*

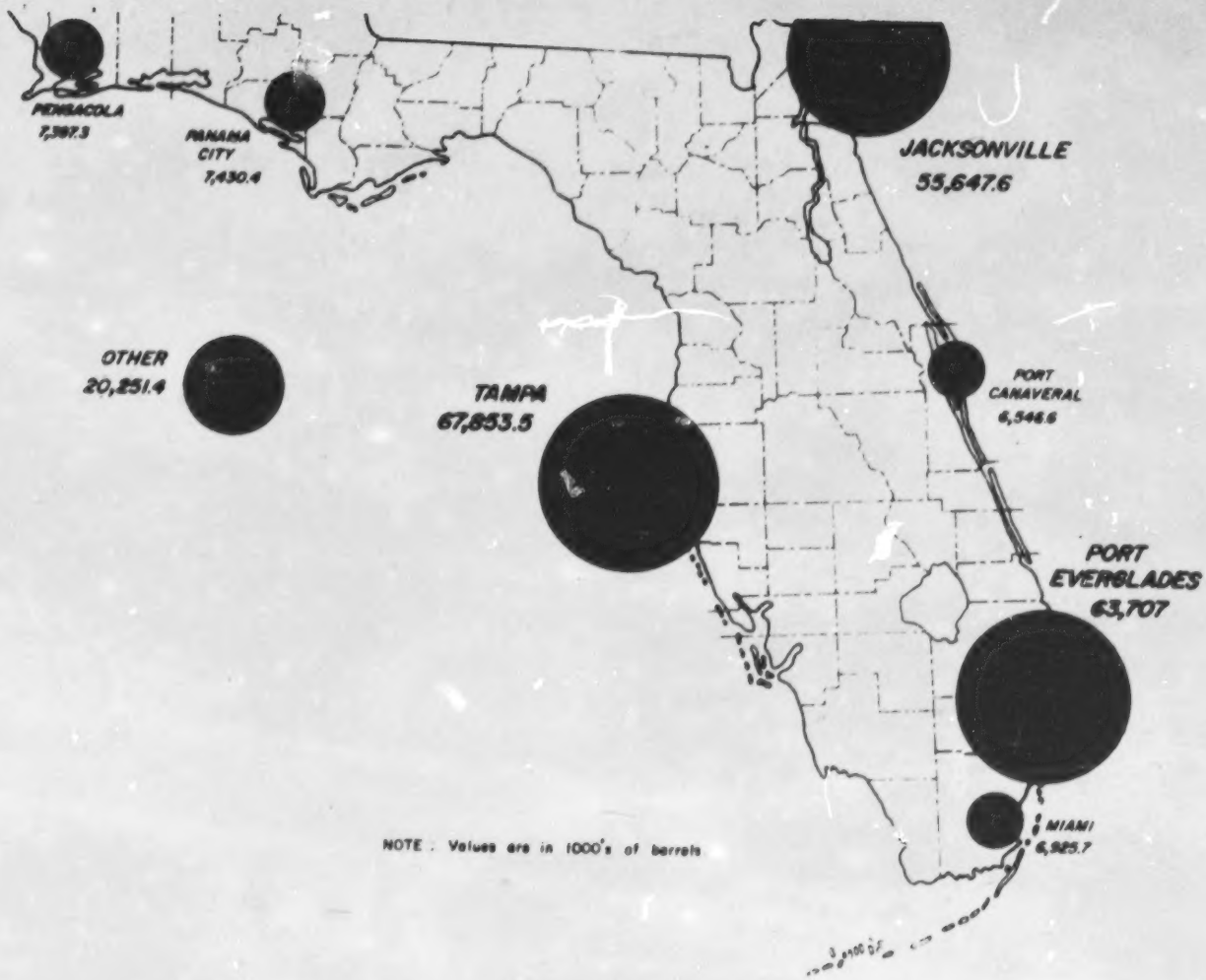
Phase A: Examine the above graph carefully. As a Floridian, what does this graph tell you about your future in the next decade?

a) I'll have plenty of Florida crude oil.
b) I'll have less Florida crude oil.
c) I'll have no Florida crude oil.
d) I'll have more Florida crude oil.

What events could happen which would make the prediction in this graph incorrect?

If you could change the oil field reserves in Florida with a magic wand, what would you do? Where might you locate the oil reserves? How would you redraw the line on this graph?

RESERVES. The quantity of mineral or fuel in the ground which can be produced under current economic and operating conditions.



Receipt of petroleum products by Florida ports for 1972. *(Map by Florida Resources and Environmental Analysis*

Phase A: Examine the above map carefully. What is it telling you?

What is a "petroleum product?" Give three examples: _____

_____

_____

Define these terms, using your dictionary: port, import, receipt.
Tell how these terms are useful in understanding the above map.

Name the three ports which handle the most oil and oil products entering Florida. _____, _____, _____

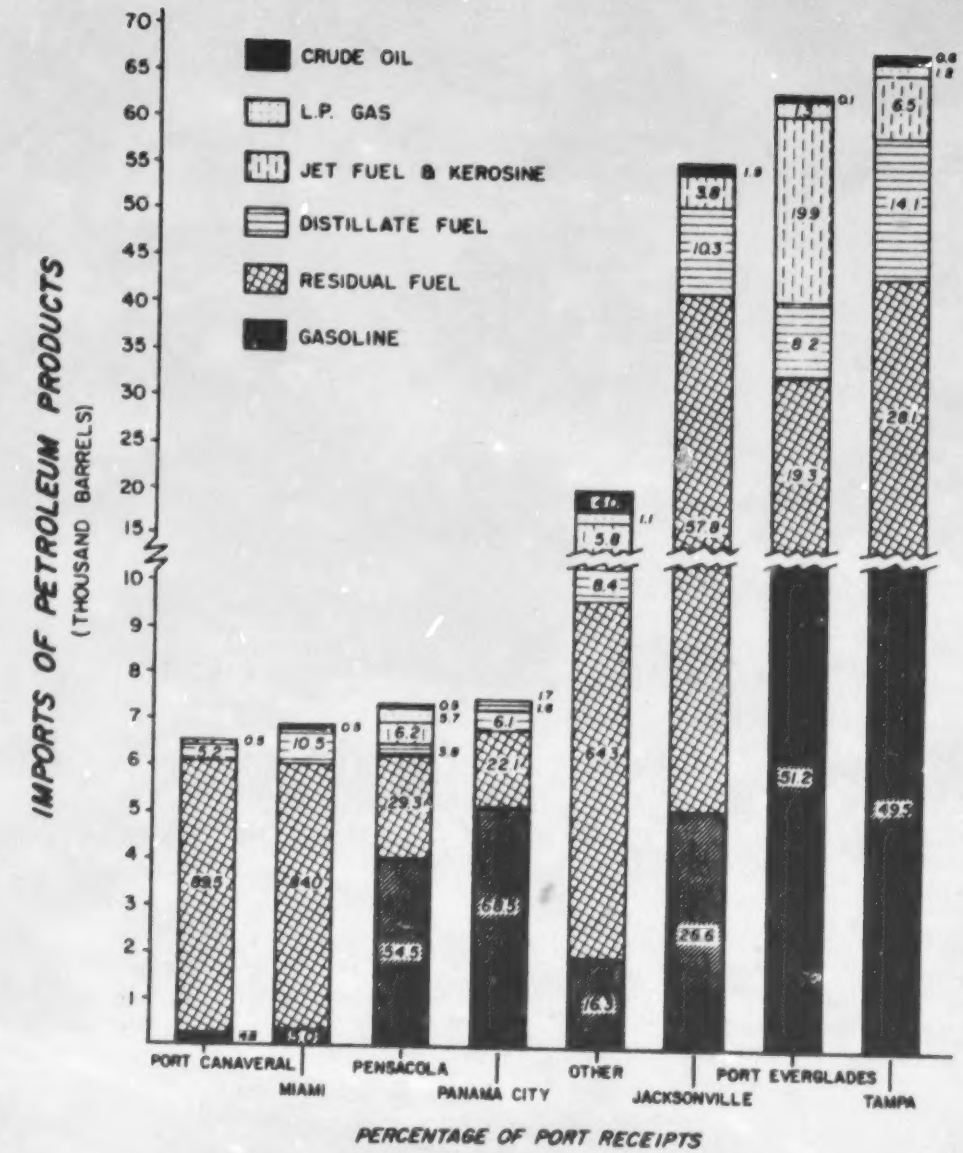
Phase B: Examine the chart and definitions on the next page.

Which port handled the most residual fuel? _____
Which port handled the most gasoline? _____
Which port handled the most L.P. gas? _____
Which port handled the least gasoline? _____ _____

What does this chart tell you that is really important to you right now?

JET FUEL. Petroleum products similar to heavy naphthas and kerosine used in turbojet and turboprop aircraft. Naphtha-type jet fuel is primarily used in military aircraft while commercial aviation utilizes kerosine-type jet fuel.

KEROSINE. A petroleum product with boiling points intermediate between gasoline and distillate fuels, primarily used for heating and produced as kerosine-type jet fuel for aviation.



Imports of petroleum products by port for 1972. *(Graph by Florida Resources and Environmental Analysis Center)*

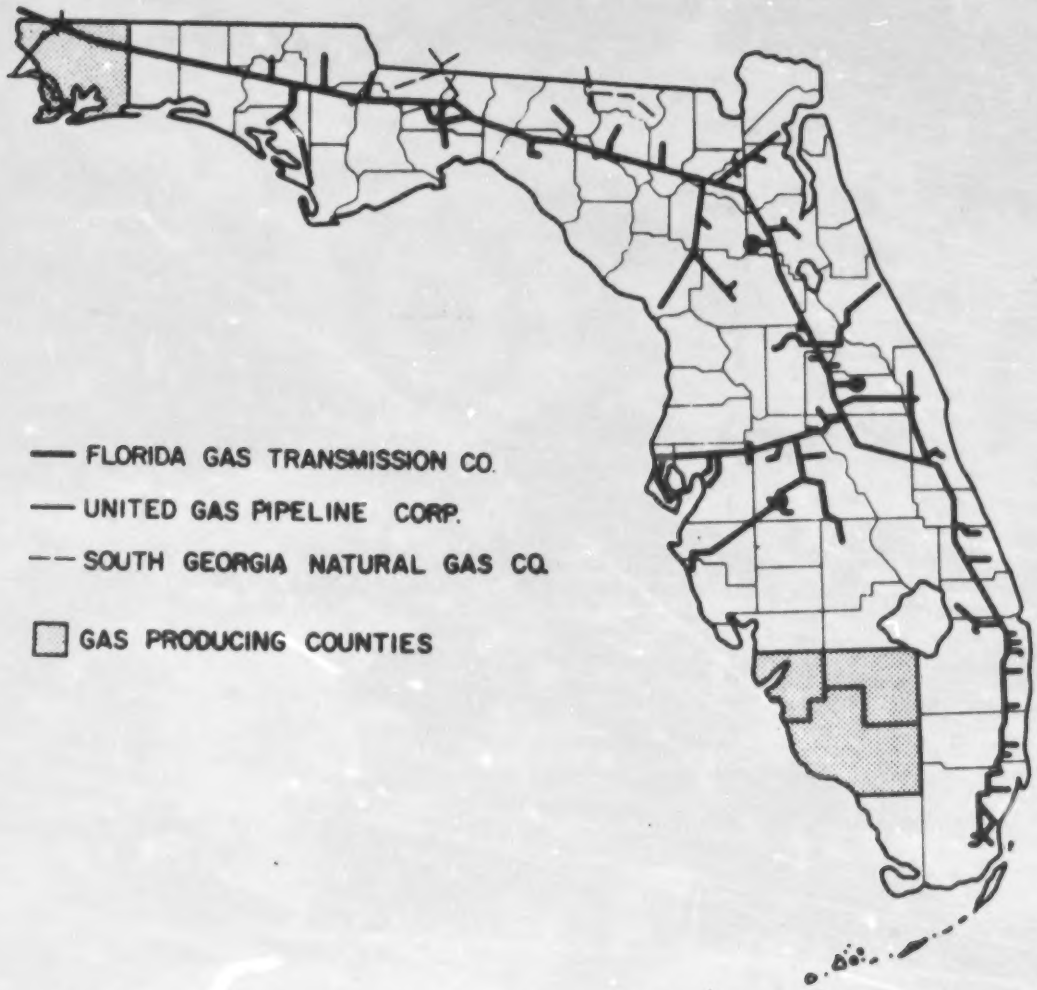
BARREL. A unit of volume equal to 42 gallons or 5.61 cubic feet.

DIESEL OIL. A range of petroleum products, similar to number 1, 2, and 4 fuel oils, used in diesel engines in buses, trucks, and heavy construction equipment.

DISTILLATE FUEL OIL. A class of petroleum products produced from crude oil by distillation and having boiling points in the range from 550 to 1,200 degrees Fahrenheit. Such products, also referred to as middle distillates or fuel oils, include kerosine, number 2 and 4 heating oils, and diesel fuel.

GAS, LIQUEFIED PETROLEUM (LPG). A mixture of hydrocarbons, gaseous at room temperature but easily liquefied under pressure, consisting primarily of propane and butane. LPG, also called bottled gas, is used in Florida for residential heating and cooking as well as for industrial direct heating applications.

RESIDUAL OIL. Heavy petroleum fractions remaining after all lighter distillate oils have been extracted from crude oil. Residual oil is used to generate electricity, produce heat in large commercial or industrial applications, and to power some vessels.



Interstate natural gas pipelines serving Florida. ***(Map by Florida Resources and Environmental Analysis Center)***

Natural gas, the second largest source of energy for Florida, supplied almost 18% of the energy consumed in 1972 and has supplied a nearly constant fraction of the total energy since 1960.

Most of the natural gas delivered to Florida consumers is transported by three interstate pipelines shown in Figure 8. Florida Gas Transmission Company operates the principal supply line, which begins near the Mexican border in Texas and extends to a point south of Miami. For most of its length in Florida this line consists of two parallel lines with diameters of 30 and 24 inches. United Gas Pipeline Corporation and South Georgia Natural Gas Company both operate extensive pipeline systems outside the state but serve only small areas of North Florida

Phase A: What is "natural gas?" Try your own definition. Then check a dictionary or a science textbook.

How important is natural gas in the Florida energy picture?

If you wanted to use natural gas in your new factory, name five counties where you would <u>not</u> locate your new factory. Give your reasons for naming those counties.

Lesson IV

AN ENERGY POLICY STATEMENT FOR FLORIDA

Energy development and energy use impact strongly on the general welfare of the citizens of Florida and the United States. They affect state and national growth, resource availability, national security, and environmental quality. The increase in energy use has been based primarily on energy derived from depletable fossil fuel reserves. Florida perhaps more than other states is especially vulnerable to changes in energy availability:

--Florida, with little indigenous primary energy production or processing, is dependent upon other states and nations to supply its energy needs.

--Florida is most dependent upon petroleum and natural gas for its energy, and these fuels are in shortest supply.

--Florida imports much of its petroleum from overseas and therefore is subject to the high international prices for petroleum.

--The electrical interties with other states are relatively weak and thus the state is electrically somewhat isolated.

--Important sectors of Florida's economy, such as tourism and agriculture, are critically dependent upon adequate energy supplies.

Phase A: Read the above policy statement carefully. List any words you do not know. Add the following words to your list:

welfare	fossil fuel	reserves
depletable	vulnerable	indigenous
dependant	interties	sectors

With your class, learn these words and use them in a discussion.

Phase B: In small group sessions, each group should select one energy problem listed above and list as many alternative solutions as you can in twenty minutes. Each group should share its problem and alternatives with the entire class. As citizens, where do you want to go from here?

FOSSIL FUEL. The class of energy sources, including coal, petroleum, and natural gas, originating from organic material deposited during geologic history.

Lesson V

Coal has consistently been a minor source of energy for the state and supplied only 5.0% and 7.2%, respectively, of the total energy consumed in 1960 and 1972. Electric utilities account for nearly all coal consumption in Florida, but Florida utilities rely on coal for only 17% of their energy needs while the nation meets 44.5% of electric utility requirements with coal.

Florida is completely dependent on outside sources for a coal supply and has historically obtained this fuel from Kentucky, Alabama, and Illinois. Although reporting procedures preclude determining the exact quantity provided by each state, approximately 60% of total 1972 consumption came from the fields of western Kentucky. This area has always provided a large fraction of the coal consumed and has never supplied less than 50% for any of the years examined. All three states provided portions of the remaining 40%, but precise quantities cannot be determined.

The major portion of the coal consumed in Florida is transported by barge, but rail transport is used to supply those consumers isolated from water routes. As shown in Table 13, over 90% of the coal consumed is now brought to Florida by barge. The volume of coal shipped to Florida via rail has been relatively constant since 1960, but its relative importance has diminished with the rapid growth in barge shipments.

Coal arriving in Florida is normally shipped directly to the power plant where it will be consumed, as illustrated in Figure 9. Shipments travel down the Mississippi via river barges and, if destined for Tampa, the coal is reloaded onto ocean-going barges for the trip across the Gulf. Waterborne shipments to Gulf Power Company make the trip in river barges only.

Until recently, all coal consumed in Florida was mined in the United States, but during the past year Gulf Power Company contracted for 2.5 million tons of low-sulfur coal from South Africa to be delivered through 1976. The first 35,000-ton shipment arrived in Mobile, Alabama, in August, 1974, and a total of 520,000 tons was to be delivered by the year's end. The quantity contracted for almost equals Gulf Power Company's total consumption in 1973.

COAL. A solid mineral, composed chiefly of carbon, of varying energy content and percentage of non-carbon materials including ash, moisture, and sulfur.

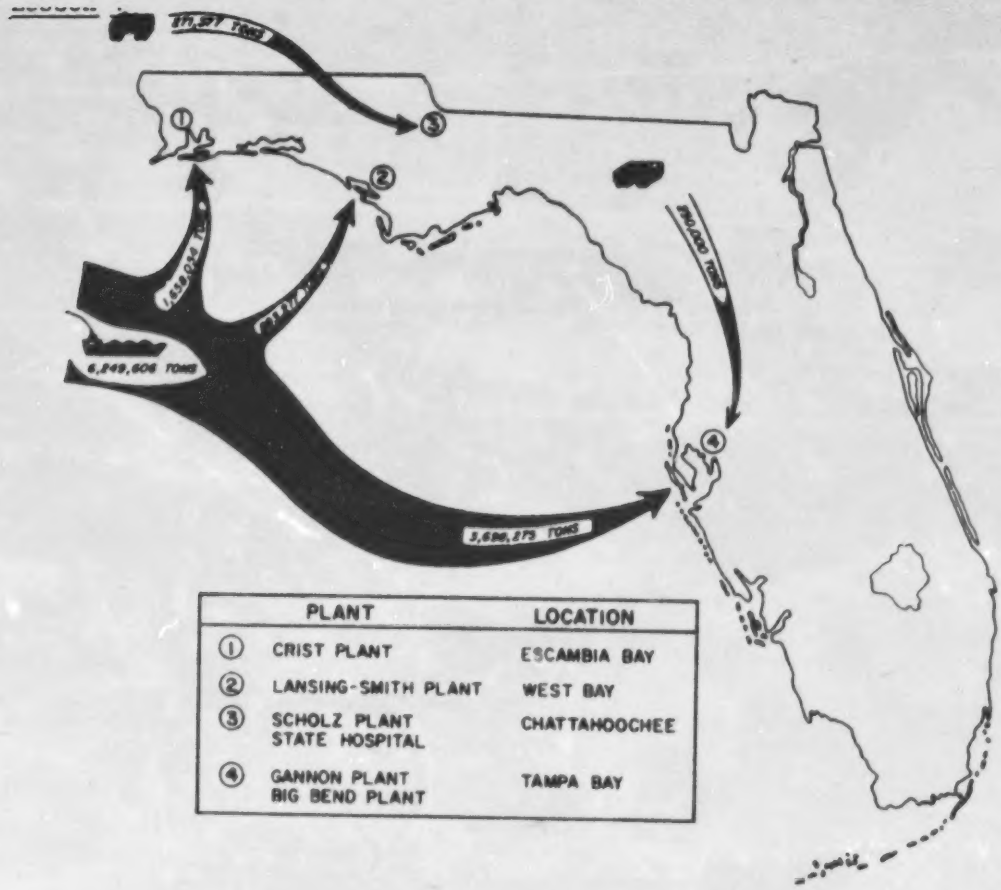
BITUMINOUS COAL. Soft coal with a heat content of 24 to 30 million BTU per ton and a high percentage of volatile material.

LOW SULFUR FUEL. Fuel, usually coal or petroleum, with a sulfur content of less than 1 percent by weight.

Phase A: Examine this page and the next one. Where is coal produced in Florida? What are the sources of Florida coal? List two ways in which coal is conveyed to Florida. Then, check the following, true or false:

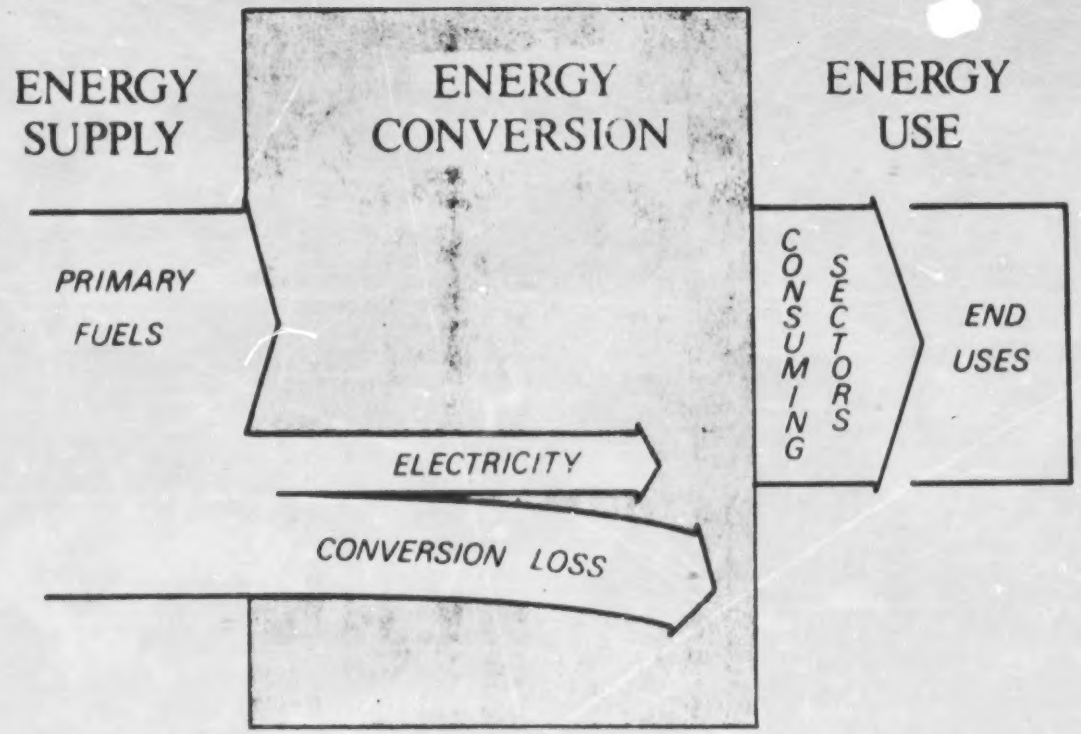
1) Coal is a major source of energy in Florida.
2) From 1960 to 1972 the use of coal in Florida increased.
3) One company imports low-sulfur content coal to reduce dangerous air pollution.

Phase B: Do library research to find out what you can about South Africa's racial policies. Should Floridians seek cheaper, cleaner energy by trading with South Africa, or should we refuse such trade because of apartheid?



Delivery of coal consumed by electric utilities and a state hospital in Florida during 1973. *(Map by Florida Resources and Environmental Analysis Center)*

OURCES: *Coal Traffic Annual*, National Coal Association.
nnual Reports of Electric Utilities to Federal Power Commission (Form No. 1), U.S. Federal Power Commission.
pply and Demand for Energy in the United States and Regions: 1960 and 1965, U.S. Bureau of Mines.
lorida State Hospital at Chattahoochee.



ENERGY CONVERSION

Approximately 42% of the energy consumed in Florida passes through the conversion process necessary for the generation of electricity, and about 30% is consumed during this process. Direct energy use by the consuming sectors accounted for 66% of 1972 consumption, with transportation responsible for over one-half of this direct use. Direct energy use by other individual sectors is relatively small when compared to transportation, but when indirect use is apportioned among all consuming sectors the energy consumed by the residential, commercial, and industrial sectors becomes more significant

PRIMARY ENERGY. Energy available directly from the original fuel, such as petroleum or natural gas, rather than from a secondary form such as electricity.

SECONDARY ENERGY. Energy in a form other than as originally produced, such as electricity produced from petroleum.

DIRECT ENERGY USE. Consumption of energy by the ultimate user directly for heating or production of mechanical energy rather than for conversion of energy to a different form.

ENERGY BALANCE FOR ELECTRICTY GENERATION IN FLORIDA, 1960-1972

	1960		1972	
	Trillion BTU	Percentage of Total	Trillion BTU	Percentage of Total
Petroleum	82.3	40.7	426.1	58.4
Natural gas	91.5	45.3	178.6	24.5
Coal	27.2	13.5	123.6	16.9
Nuclear energy	0.0	0.0	0.6	0.1
Hydroelectricity	1.0	0.5	0.9	0.1
Total energy input for generation	202.0	100.0	729.8	100.0
Energy lost in generation	(141.1)	(69.9)	(499.8)	(68.5)
Net energy generated	60.9	30.1	230.0	31.5
Uses and other losses	(3.0)	(1.5)	(26.5)	(3.6)
Net sales to ultimate customers	57.9	28.5	203.5	27.9

SOURCE: *Patterns of Energy Consumption in Florida*, Florida Resources and Environmental Analysis Center.
NOTE: Figures shown in parentheses represent energy losses and are subtracted from the totals.

Phase A: Use your dictionary and write out definitions for the following:
conversion loss net energy

Then, read the previous page and examine the table above.

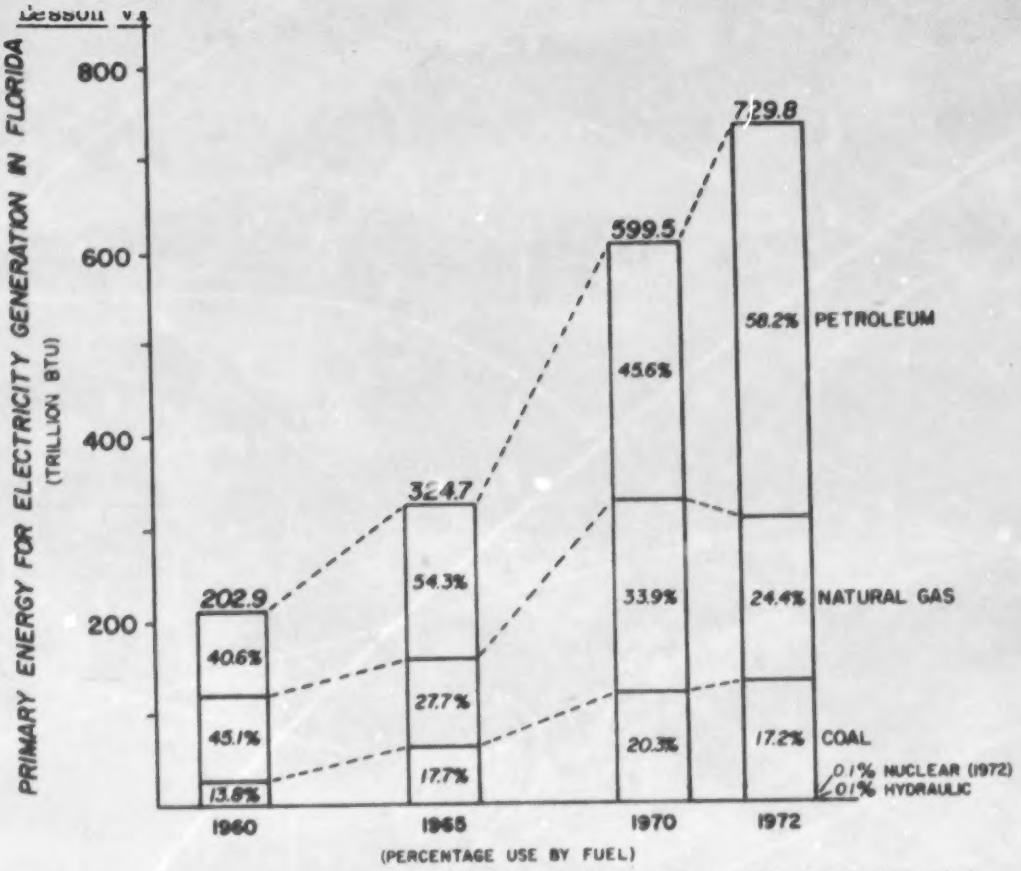
Phase B: -Why is electricity called a "secondary energy?"
-In 1972, 729.8 trillion BTUs were used to generate electricity, but how many BTUs of electric energy were actually sold to customers?
-How do you account for this difference (loss)?
-In 1972 what percentage of the energy devoted to electric generation was actually delivered to customers? What percentage was "lost?" How?

Phase C: Conduct a class discussion on the following questions:

Harry wants to heat water at home in a way that saves the most energy. He can buy a gas water heater or an electric one. Which should he choose? Why?

Harriet wants a nice warm home in North Florida where the winters get cool. One salesperson tells her about oil burners, another tells her about Gold Medallion, all-electric homes. Which would you advise Harriet to buy? Why?

In summary, the conversion of primary fuel to electricity in Florida has shown substantial increase between 1960 and 1972 with petroleum remaining the dominant energy source. All consuming sectors have participated in this growth, although residential use accounts for almost half of 1972 electricity sales.



Primary energy for electricity generation in Florida for 1960-1972. *(Graph by Florida Resources and Environmental Analysis Center)*

Phase A: Let's read the above graph. In your own words, what is the graph trying to tell us?

- Which two sources provide the lowest amounts of electricity? (You might do library research to discover where these sources are found in Florida.)
- From 1960 to 1972, which source of fuel for electric generation has experienced the most growth?
- From 1960 to 1972, which source of power for electric generation declined as a percentage of the total power used for generating electricity?

Phase B: Does the information on this graph support or deny the truth of the statement printed at the bottom of the previous page? Why? Why not?

Lesson VI

FLORIDA ELECTRICITY GENERATING CAPABILITY
(As of December 31, 1973)

UTILITY	SUMMER CAPACITY IN MEGAWATTS				
	Fossil Steam	Combustion Turbine and Internal Combustion	Nuclear Steam	Hydroelectricity	Total
Florida Power & Light Co.	5,604	1,803	1,346	0	8,753
Florida Power Corp.	1,961	578	0	0	2,539
Florida Public Utilities Co.	0	2	0	[a]	2
Gulf Power Co.	1,558	38	0	0	1,596
Reedy Creek Utilities Co.	0	6	0	0	6
Tampa Electric Co.	1,871	28	0	0	1,899
Total investor-owned	10,994	2,455	1,346	[a]	14,795
Total public-owned	2,362	638	0	30	3,030
Florida Total	13,356	3,093	1,346	30	17,825
(Winter Total)[b]	(13,815)	(3,304)	(1,386)	(30)	(18,535)

SOURCE: *Patterns of Energy Consumption in Florida*, Florida Resources and Environmental Analysis Center.

[a] Florida Public Utilities Co. operates a 0.168 megawatt hydroelectric facility near Marianna.

[b] Winter plant capacities are increased by lower cooling water temperatures.

Phase A: Examine the above table. Who controls the most electric generating capability in Florida -- public-owned or private-owned utility firms?

What is "generating capability?" What is the total difference between the capacity of public-owned and private-owned utility companies?

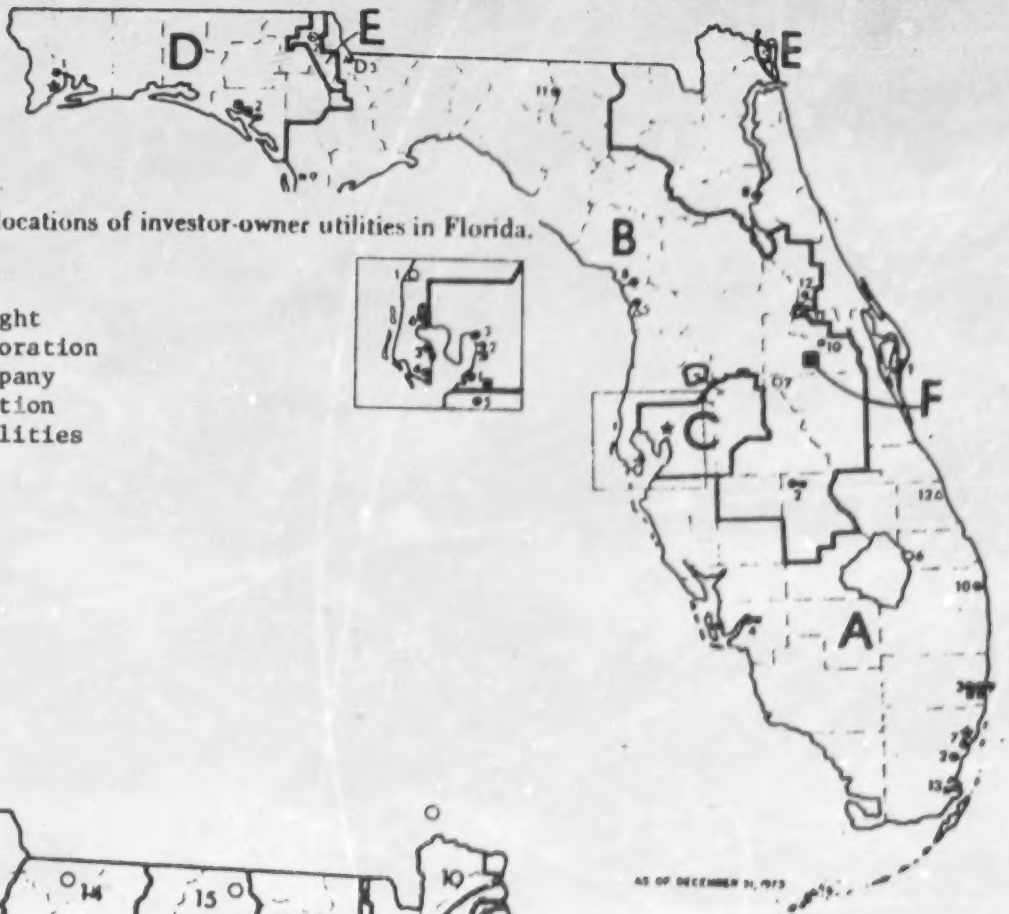
Which private-owned firm has the greatest generating capability? The smallest?

Phase B: Look at the maps on the next page. Which private-owned utility serves the largest area? Do you see any correlation between the size of the company's generating capability and the size of its area? Reflect upon what you know about population centers in Florida. Do you see any correlation between the size of a company's generating capability and the population served?

Phase C; Do library research to find out what you can about rural electric cooperatives. What does a cooperative do? Who does it serve? Examine the map on the next page. How many cooperatives generate their own power? How do the others get electric energy to serve their customers?

1. CAPABILITY, ELECTRICITY GENERATION. The maximum rate at which electricity can be generated from a generating station or a system of generating stations to meet peak electricity demands, usually expressed in kilowatts or megawatts.

2. POWER. The rate of generating or consuming energy, often measured in kilowatts or BTU per hour.

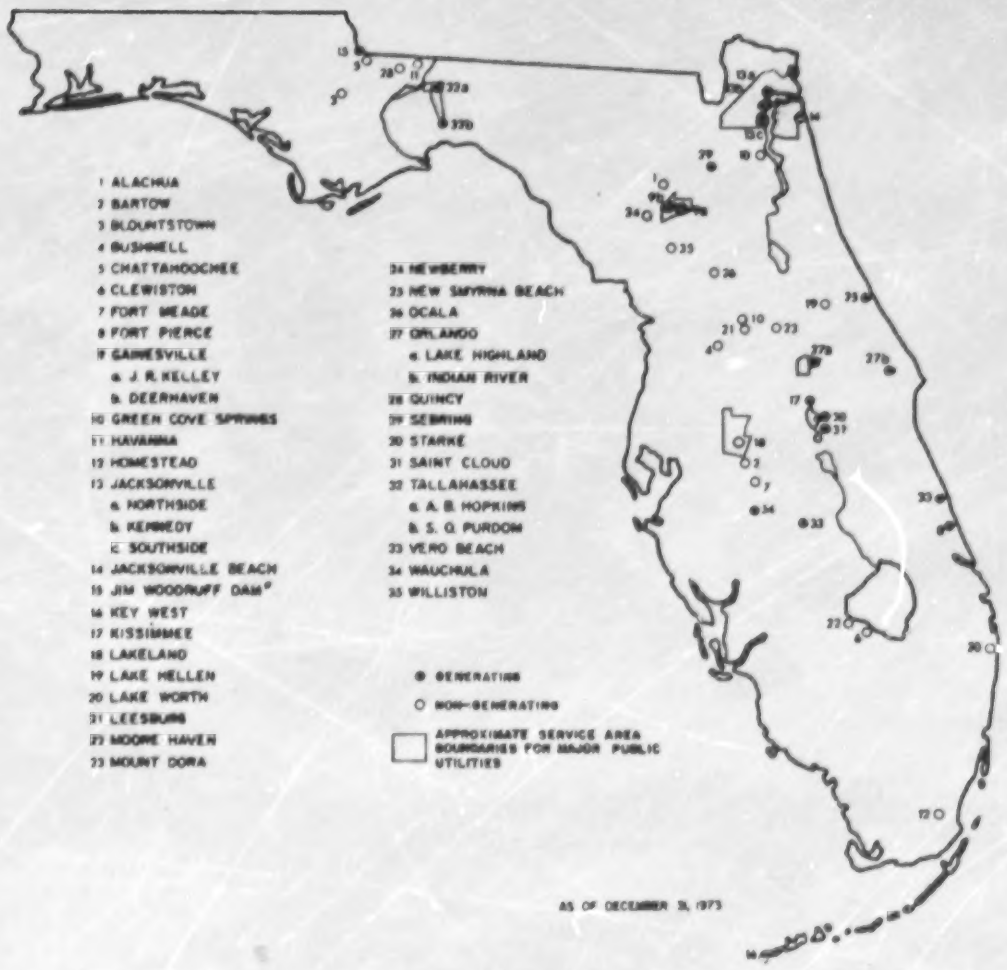


Service areas and plant locations of investor-owner utilities in Florida.

A Florida Power & Light
B Florida Power Corporation
C Tampa Electric Company
D Gulf Power Corporation
E Florida Public Utilities
F Reedy Creek

1 ALABAMA ELECTRIC COOPERATIVE, INC - Andalusia, Ala
2 CENTRAL FLORIDA ELECTRIC COOPERATIVE - Chiefland
3 CHOCTAWHATCHEE ELECTRIC COOPERATIVE - Defuniak Springs
4 CLAY ELECTRIC COOPERATIVE - Keystone Heights
5 ESCAMBIA RIVER ELECTRIC COOPERATIVE, INC - Jacksonville
6 FLORIDA KEYS ELECTRIC COOPERATIVE - Tavernier
7 GLADES ELECTRIC COOPERATIVE, INC - Moore Haven
8 GULF COAST ELECTRIC COOPERATIVE, INC - Wewahitchka
9 LEE COUNTY ELECTRIC COOPERATIVE - North Fort Myers
10 OKEFENOKEE RURAL ELECTRIC MEMBERSHIP COOPERATIVE - Nahunta, Ga.
11 PEACE RIVER ELECTRIC COOPERATIVE - Wauchula
12 SUMTER ELECTRIC COOPERATIVE, INC - Sumterville
13 SUWANNEE VALLEY ELECTRIC COOPERATIVE, INC - Live Oak
14 TALQUIN ELECTRIC COOPERATIVE, INC - Quincy
15 TRI-COUNTY ELECTRIC COOPERATIVE, INC - Madison
16 WEST FLORIDA ELECTRIC COOPERATIVE, INC - Graceville
17 WITHLACOOCHEE RIVER ELECTRIC COOPERATIVE, INC - Dade City
NON-GENERATING
GENERATING
NON-SERVICED AREAS

Service areas of rural electric cooperatives in Florida.



Service areas of public-owned utilities in Florida. *(Map by Florida Resources and Environmental Analysis Center)*

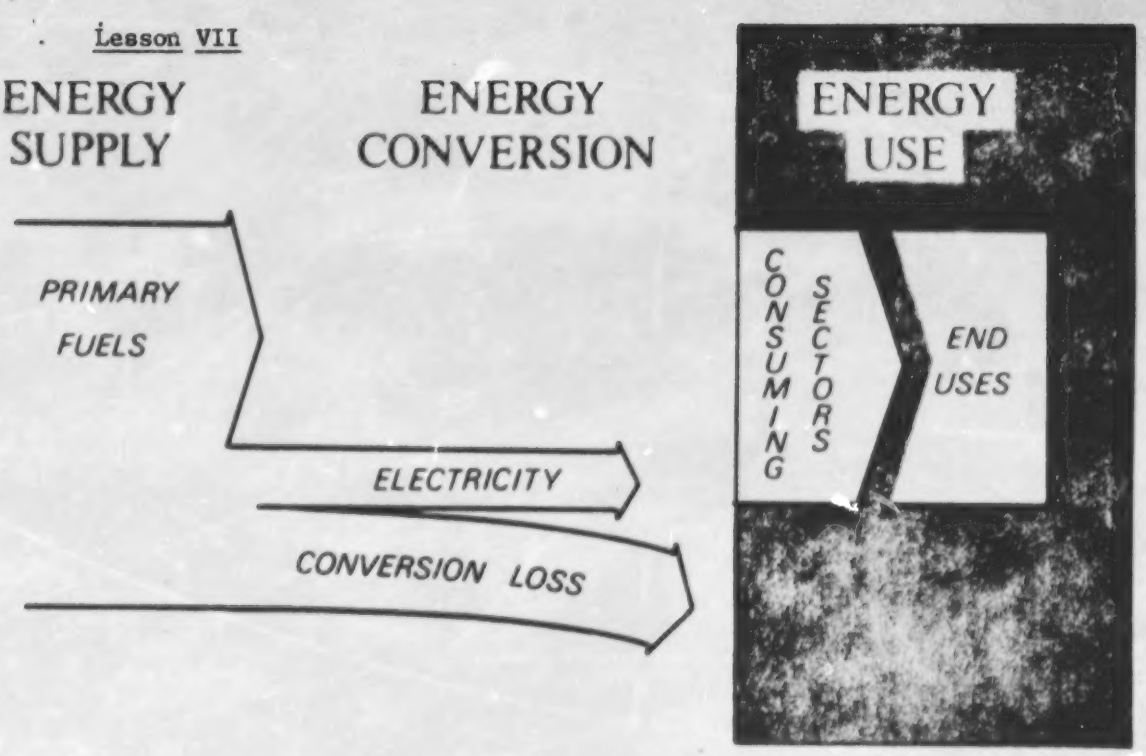
Phase A: Examine the above map. What is it trying to tell you.

How many public-owned utility companies are shown on the map? Where do they get their electric power? --How many generate their own? How many buy from other companies? --Where might they buy this power --from what sources?

Phase B: In small groups(doing some interviews and library work) reflect upon these questions:

What advantages would a public-owned utility have for consumers?

What disadvantages might a public-owned utility have for consumers?

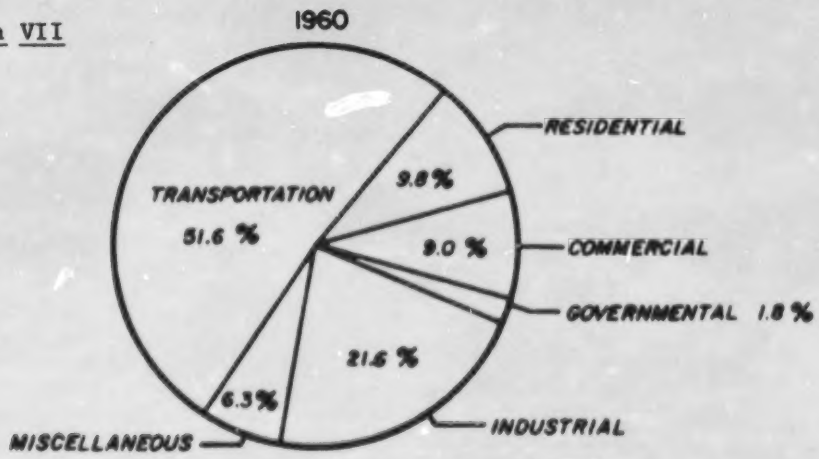


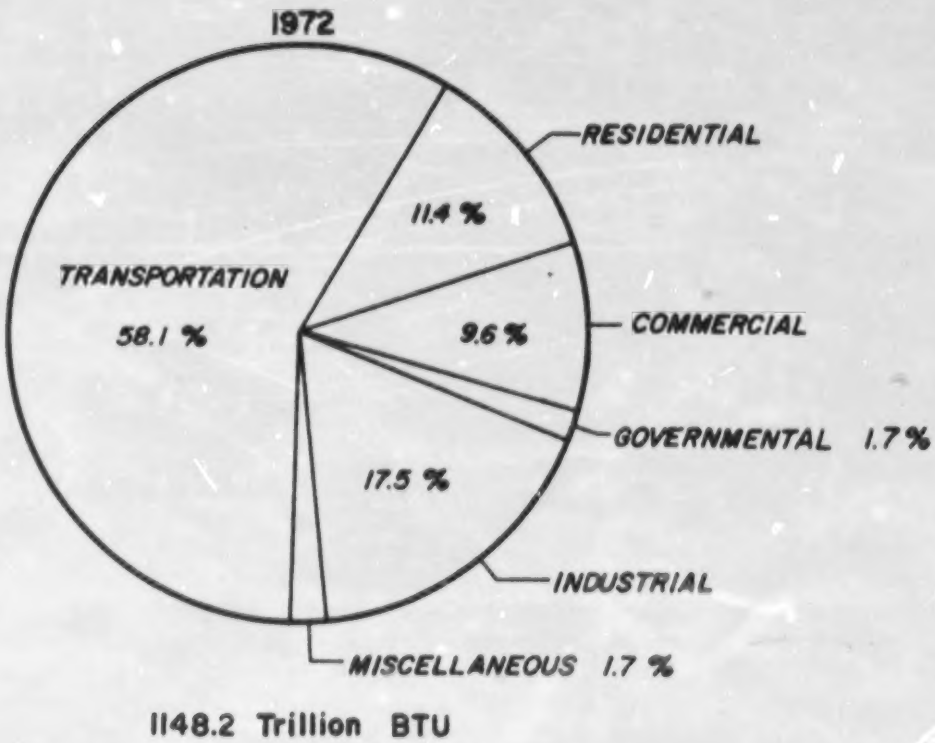
ENERGY USE

No understanding of Florida's energy profile can be complete without prior understanding of the ultimate or end uses to which energy is applied. This part of the present study enumerates the end uses of energy in Florida, analyzing the types and amounts consumed by the general subdivisions of the state's economy: the residential, commercial, governmental, industrial, and transportation sectors. Such information is subsequently reorganized to indicate the actual and proportionate amounts of energy consumed for a dozen major uses, ranging from space heating to private passenger transportation.

As noted in previous sections, the amount of energy delivered to end use sectors is considerably less than the total supplied to the state. This reduction is a direct consequence of the energy processing (especially electricity generation)

, since consumption of electricity by the private consumer requires 3.6 times as much energy as was delivered initially to the generating facility. While for many purposes it is correct to consider one BTU of electricity expended in end use as the equivalent of 3.6 BTU of original fuel, in this part electricity is considered as a fuel equal, BTU for BTU, to other energy forms used directly. As a result of this accounting process, the total energy noted here as consumed by all sectors (direct energy consumption) sums to a smaller figure than energy totals presented in Part Two, the difference being the energy exhausted in electricity generation and electricity and natural gas transmission (indirect energy consumption).





Energy use in Florida by sector for 1960 and 1972. *(Drawing by Florida Resources and Environmental Analysis Center)*

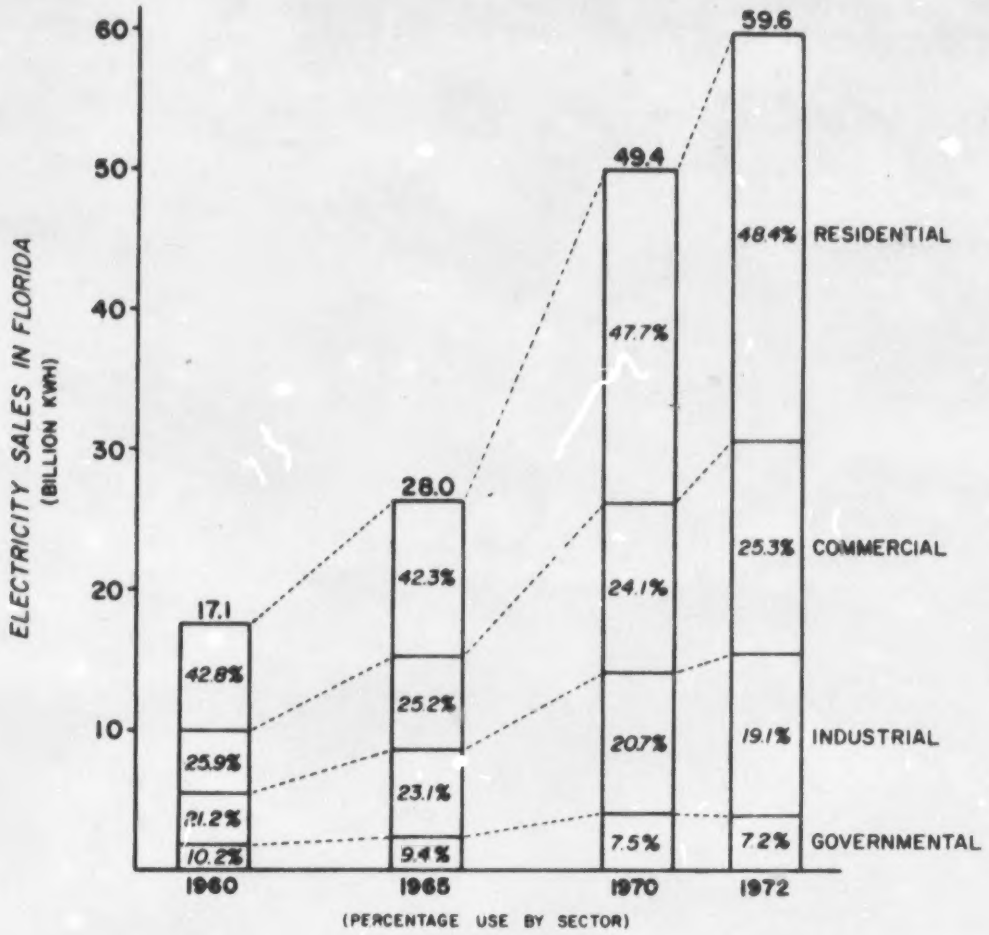
Phase A: Examine the above charts. What are the two pie diagrams trying to tell you?

Define the term sector.

What changes can you dedect from 1960 to 1972? What sector used the most energy in 1960? Which in 1972?

Phase B: Reflect upon these happenings! What might the 1972 diagram look like if 1972 had been a year of: a) severe cold winter, b) severe hot summer, c) energy crisis?

DIRECT DRIVE. The use of energy, primarily electricity, to produce mechanical energy, such as by motors.



KILOWATT (KW). A rate of generating or consuming electric energy. One kilowatt use of power equals 3,413 BTU per hour.

Electricity sales to ultimate consumers in Florida for 1960-1972. Government purchases include electricity used for street and highway lighting and military purposes. ***(Graph by Florida Resources and Environmental Analysis Center)***

Phase A: Examine the above chart. How is it different from the one on the previous page? What is this chart trying to tell you?

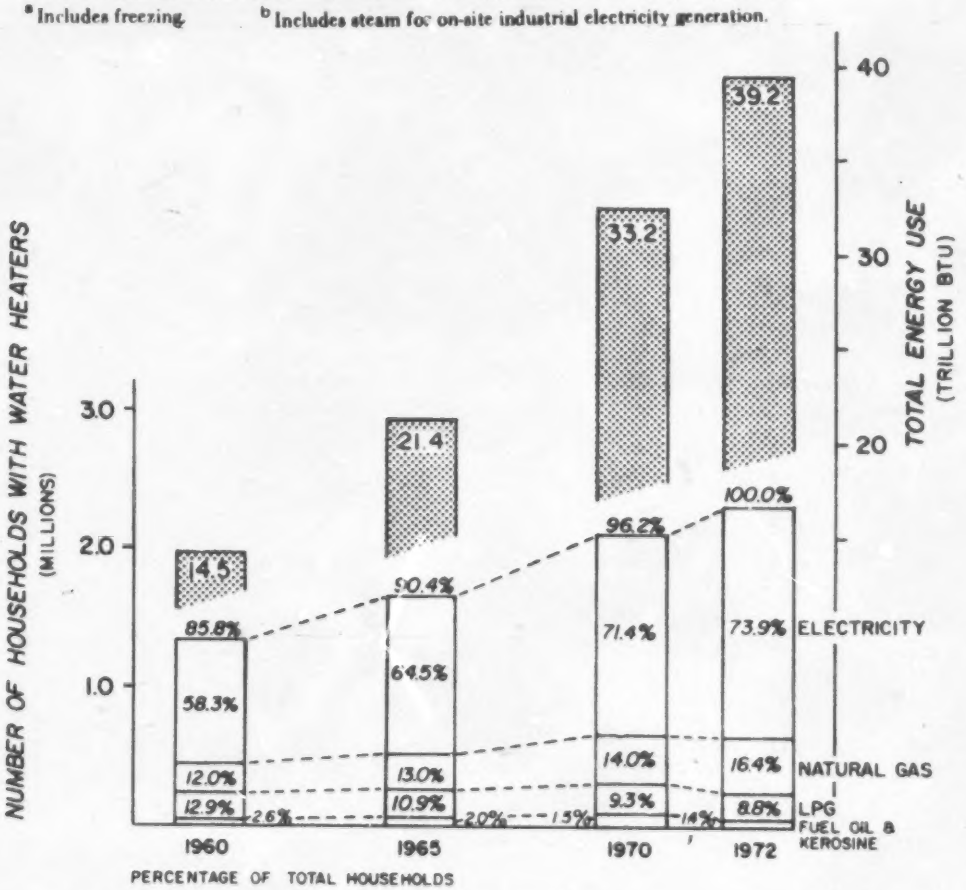
Phase B: Which sector uses the most electricity? Which sector shows the most increase from 1960 to 1972? Which sector shows the least growth?

Phase C: In small groups, list as many ways as you can think of that-- (in 10 minutes)
a) government uses electricity.
b) industry uses electricity.

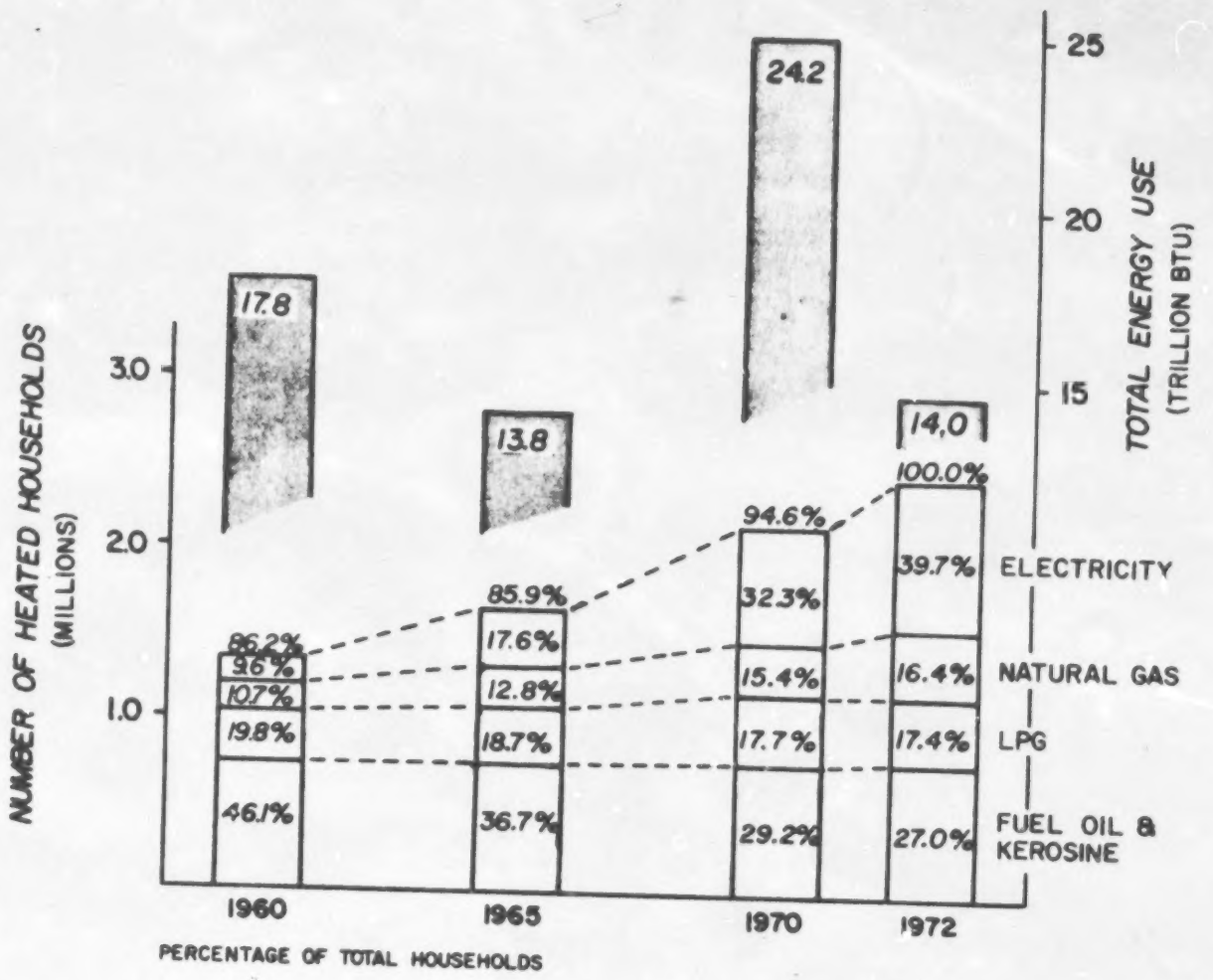
FLORIDA ENERGY CONSUMPTION BY END USE, 1960 AND 1972

END USE	1960		1972	
	Trillion BTU	Percentage of Total	Trillion BTU	Percentage of Total
Space heating	42.1	7.5	46.3	4.0
Water heating	25.0	4.4	60.2	5.2
Cooking	11.4	2.0	19.5	1.7
Air conditioning	14.2	2.5	72.2	6.3
Refrigeration[a]	4.1	0.7	16.4	1.4
Lighting	9.1	1.6	24.3	2.1
Process steam[b]	62.7	11.1	81.3	7.1
Direct heat	39.4	7.0	71.9	6.3
Direct drive	10.2	1.8	32.2	2.8
Private passenger conveyance	171.5	30.5	328.1	28.6
Public passenger conveyance	33.3	5.9	98.5	8.6
Goods and services distribution	70.3	12.5	199.4	17.4
Other	69.6	12.4	97.9	8.5
Total	562.7	100.0	1,148.2	100.0

SOURCE: *Patterns of Energy Consumption in Florida*, Florida Resources and Environmental Analysis Center.
NOTE: Totals do not include energy lost in electricity generation and energy transmission.
[a] Includes freezing. [b] Includes steam for on-site industrial electricity generation.



Florida residential energy consumption for air conditioning for 1960-1972. *(Graph by Florida Resources and Environmental Analysis Center)*



Florida residential energy consumption for space heating for 1960-1972.

(Graph by Florida Resources and Environmental Analysis Center)

Phase A: Examine the graphs on the previous page. What are the "end uses" of energy in Florida? How much energy is consumed in air conditioning in Florida?

If you were the Energy Czar in Florida and wanted to reduce energy consumption, what would be your main target? Why?
Which end-use category might be easiest to reduce? Why?
Which end-use category might be the most difficult to reduce? Why?

Phase B: Of the energy sources used for air conditioning and for space heating (see above), which are primary sources? Which are secondary sources? Does this make any difference? If not, why not? If so, why?

As the transportation sector dominates total energy consumption, so does gasoline use--especially for private passenger car requirements--dominate the sector itself. The period examined in this report also displays important trends among other fuel usage and transportation mode demands which should not be neglected even though they are dwarfed by the needs of gasoline-fueled automobiles. All modes of transportation in the state depend on petroleum-based products, swelling Florida's reliance upon oil for total energy supply.

FLORIDA TRANSPORTATION ENERGY CONSUMPTION BY MODE, 1960-1972

MODE	1960		1972	
	Trillion BTU	Percentage of Total	Trillion BTU	Percentage of Total
Automobile	184.1	63.4	367.4	55.0
Truck	39.6	13.7	145.0	21.7
Aircraft	32.3	11.1	115.7	17.3
Train	11.9	4.1	13.4	2.0
Vessel	16.5	5.7	11.3	1.7
Bus	2.3	0.8	6.2	0.9
Other	3.4	1.2	8.5	1.3
Total	290.2	100.0	667.5	100.0

SOURCE: *Patterns of Energy Consumption in Florida*, Florida Resources and Environmental Analysis Center.

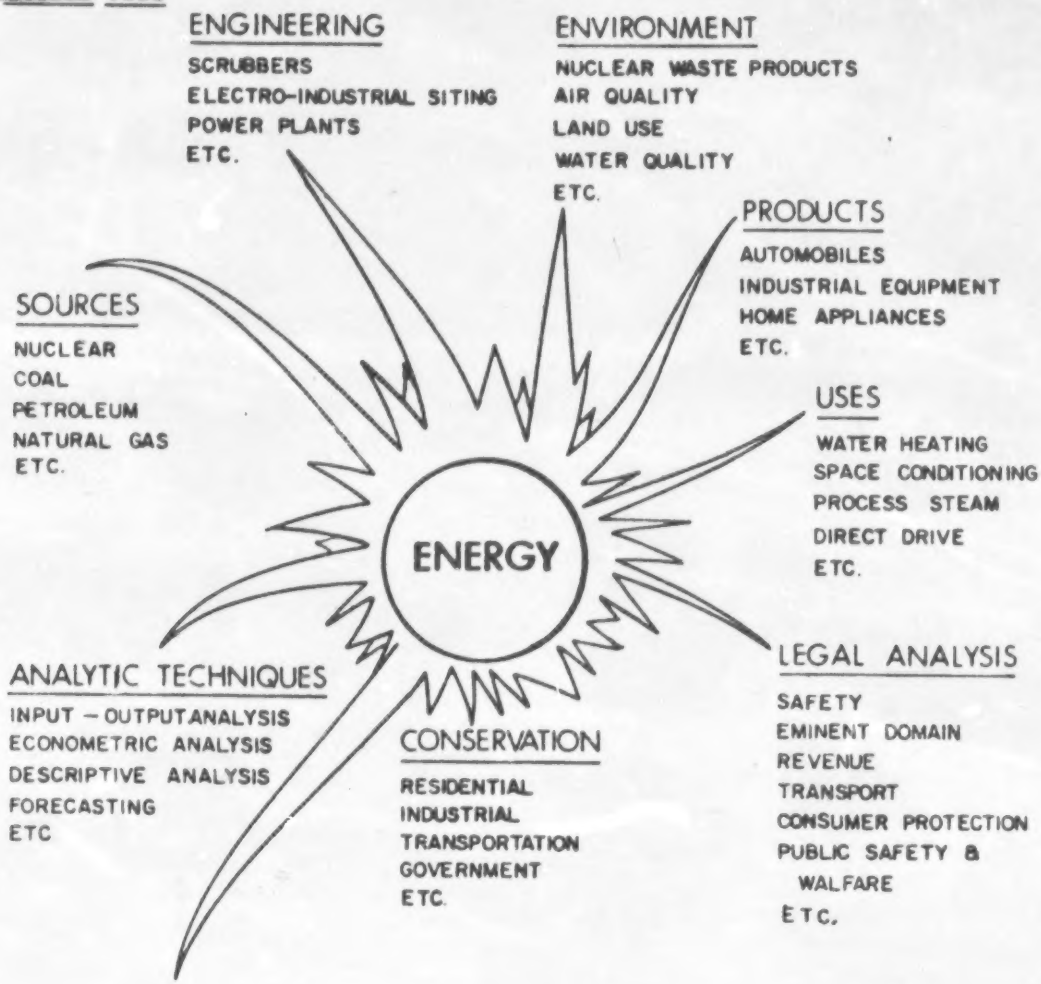
Phase A: Examine the above statement and graph carefully. Wha- is this trying to tell you?

Phase B: Of all the modes of transportation listed, can you name one mode that does <u>not</u> use petroleum based power?

If this list had been drawn up for the Florida of 1800, how might the list have been different? In small groups, make a list for 1800!

If you wanted to reduce transportation energy consumption in Florida, what mode of transportation would you begin to tackle? Why? Is there any mode of transportation which you migh- want to increase in order to decrease total consumption of energy in transportation? Which one? Why?

Lesson VIII



Phase A: With your class, examine the above diagram. What is it trying to say? Note any unfamiliar words and define them together.

If you had to draw such a diagram, would you draw it differently? Why? How?

Phase B: As you look at the diagram, do you think that anything important is missing? What?

We think that the following are missing:

--Societal Goals: How should we use the limited energy available to create a just society for everyone? A just world community?
--Personal Aspirations: How should I live, How should I act, given a world with limited energy resources and a huge demand for energy?

Lesson VIII

The following paragraph is taken from a report by the Florida Energy Office, Tallahassee. It offers some facts and at least one value judgment. Read it carefully, and then, respond to the following questions.

Overall, Florida's energy profile is one revealing heavy dependence on petroleum imported from foreign and domestic sources by water. Rapid growth of all fuels consumed has resulted from an increase in energy use throughout the state's economy, but most dramatically from expansion in electricity utilization. Electricity generation and transportation account for a major share of total demand, with 48.4% of the electricity going to serve residential needs. Consequently, any program to modify past energy consumption trends to achieve energy conservation must address transportation and electricity (especially residential) demands.

1. The paragraph contain four sentences. Which sentences are factual claims(FC) and which are value claims (VC)? 1. (___) 2. (___) 3. (___) 4. (___)

   How do you know?

2. Given what you know about energy in Florida, are the factual claims (FC) above accurate? Take one factual claim and cite evidence to support or to deny it.

3. Let's analyze the argument presented in the paragraph:

   Author's Main Point _____

   _____

   Reasons Given to Support Point: 1) _____

   _____

   2) _____

   _____

   3) _____

   _____

4. Given your analysis of this argument, does the author's main point necessarily follow from the reasons given? Could someone draw another conclusion than the one presented by the author? If yes, give an example.

Lesson VIII

ENERGY

ENERGY ENERGY

As educators our task has to involve student values (and our own!). Here we need to identify those problem areas involving energy and personal behavior, societal policy, and world community. Write down a list, or your thoughts.

Again, as educators and as students we need to confront the value conflicts (and conflicts between self-interest and commitments) whichare involved in the energy problem areas. List some of the conflicts you see and feel.

---vís-a-vís---

---vís-a-vís---

---vís-a-vís---

---vís-a-vís---

---vís-a-vís---

Lesson VIII

To provide guidance and coherence for energy policy, the Florida Energy Committee recommends these goals as the basis of a state energy policy.

It is the policy of the state to act such that energy is available to maximize the health, safety, and economic and social well-being of its citizens.

Four specific goals are identified:

1. *That there should be adequate and reliable sources of energy.*
2. *That there should be a minimum of environmental degradation resulting from the acquisition and use of adequate and reliable supplies of energy.*
3. *That energy should be available at the lowest total cost to society consistent with the first two goals.*
4. *That there should be equitable access to energy, including the minimum energy necessary for meeting basic needs, for all citizens.*

[Teachers: Given the examples in Allen, et al., Deciding How to Live on Spaceship Earth and the energy resources available, we need to draft some sets of ethics cases where the four goals above are in conflict. These should make superb decision-making/justification situations for students' moral development --and perhaps, for our own.]